User's Manual

DPharp EJX™

EJX118B and EJX438B Diaphragm Sealed Differential Pressure and Pressure Transmitters

IM 01C27H01-01EN

vigilantplant®

DPharp FOR THE DIGITAL WORLD

YOKOGAWA
Yokogawa Electric Corporation

IM 01C27H01-01EN
7th Edition

EJX118B and EJX438B
Diaphragm Sealed
Differential Pressure and Pressure Transmitters

IM 01C27H01-01EN 7th Edition

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1. Introduction

Thank you for purchasing the DPharp EJX Differential Pressure and pressure transmitter.

Your EJX Pressure Transmitter was precisely calibrated at the factory before shipment. To ensure both safety and efficiency, please read this manual carefully before you operate the instrument.

NOTE

This manual covers the EJX118B and EJX438B diaphragm sealed differential pressure and pressure transmitter and describes how to use for not only the integral antenna type transmitters but also the detachable antenna ones.
Unless otherwise stated, the illustrations in this manual are of the EJX118B diaphragm sealed differential pressure with an integral antenna type. Users of the other models and specifications should bear in mind that certain features of their instrument will differ from those shown in the illustrations of the EJX118B.

Model
EJX118B
EJX438B

■ Regarding This Manual

- This manual should be provided to the end user.
- The contents of this manual are subject to change without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- Yokogawa makes no warranty of any kind with regard to this manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.
- The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made instruments.
- Please note that changes in the specifications, construction, or component parts of the instrument may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.
- Yokogawa assumes no responsibilities for this product except as stated in the warranty.
- If the customer or any third party is harmed by the use of this product, Yokogawa assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.
- The following safety symbols are used in this manual:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or physical damage. It may also be used to alert against unsafe practices.

IMPORTANT

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

NOTE

Draws attention to information essential for understanding the operation and features.

1.1 Safe Use of This Product

For the safety of the operator and to protect the instrument and the system, please be sure to follow this manual's safety instructions when handling this instrument. If these instructions are not heeded, the protection provided by this instrument may be impaired. In this case, Yokogawa cannot guarantee that the instrument can be safely operated. Please pay special attention to the following points:

(a) Installation

- This instrument may only be installed by an engineer or technician who has an expert knowledge of this device. Operators are not allowed to carry out installation unless they meet this condition.
- With high process temperatures, care must be taken not to burn yourself by touching the instrument or its casing.
- Never loosen the process connector nuts when the instrument is installed in a process. This can lead to a sudden, explosive release of process fluids.
- When draining condensate from the pressure detector section, take appropriate precautions to prevent the inhalation of harmful vapors and the contact of toxic process fluids with the skin or eyes.
- When removing the instrument from a hazardous process, avoid contact with the fluid and the interior of the meter.
- All installation shall comply with local installation requirements and the local electrical code.

(b) Wiring

- The instrument must be installed by an engineer or technician who has an expert knowledge of this instrument. Operators are not permitted to carry out wiring unless they meet this condition.

(c) Maintenance

- Please carry out only the maintenance procedures described in this manual. If you require further assistance, please contact the nearest Yokogawa office.
- Care should be taken to prevent the build up of dust or other materials on the display glass and the name plate. To clean these surfaces, use a soft, dry cloth.

(d) Explosion Protected Type Instrument

- Users of explosion proof instruments should refer first to section 2.8 (Installation of an Explosion Protected Instrument) of this manual.
- The use of this instrument is restricted to those who have received appropriate training in the device.
- Take care not to create sparks when accessing the instrument or peripheral devices in a hazardous location.
- Repair or modification to this instrument by customer will cause malfunction of explosion protect function and hazardous situation. If you need to repair or modification, please contact the nearest Yokogawa office.

(e) Modification

- Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.

1.2 Radio Wave

IMPORTANT

- This instrument is equipped with a wireless module which is designated as a certification of construction type as a wireless facility for 2.4 GHz band low-power data communication system of the Radio Act. Refer to 2.12 “Regulatory Compliance for Radio and Telecommunication” for detail.
- Due to the designated certification of construction type, users may be subject to legal punishment in case of:
  - Disassembling or modifying the wireless module or antenna in this instrument
  - Peeling off the certification label attached to the wireless module in this instrument
- Preventing interference with other wireless stations
  The operating frequency bandwidth of this instrument may overlap the same range as industrial devices, scientific devices, medical devices, microwave ovens, licensed premises radio stations and non-licensed specified low-power radio stations for mobile object identification systems used in factory production lines.
  Before using this instrument, ensure that neither a premises radio station nor specified low power radio station for mobile object identification systems is in use nearby.
  If this instrument causes radio wave interference to a wireless station for mobile object identification systems, promptly change the frequency being used or turn off the source of radio wave emissions.
  Then, contact a Yokogawa office regarding countermeasures to prevent interference, such as setting up partitions.

1.3 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurring during the warranty period shall basically be repaired free of charge.
- If any problems are experienced with this instrument, the customer should contact the Yokogawa representative from which this instrument was purchased or the nearest Yokogawa office.
- If a problem arises with this instrument, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
- The party responsible for the cost of fixing the problem shall be determined by Yokogawa following an investigation conducted by Yokogawa.
- The purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:
  - Improper and/or inadequate maintenance by the purchaser.
  - Malfunction or damage due to a failure to handle, use, or store the instrument in accordance with the design specifications.
  - Use of the product in question in a location not conforming to the standards specified by Yokogawa, or due to improper maintenance of the installation location.
  - Failure or damage due to modification or repair by any party except Yokogawa or an approved representative of Yokogawa.
  - Malfunction or damage from improper relocation of the product in question after delivery.
  - Reason of force majeure such as fires, earthquakes, storms/floods, thunder/lightening, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.

1.4 Trademarks

In this document, trademarks or registered trademarks are not marked with “™” or “®”. Product names and company names in this document are trademarks or registered trademarks of the respective companies

1.5 ATEX Documentation

This is only applicable to the countries in European Union.

GB
All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.

DK
Alle brugervejledninger for produkter relateret til ATEX Ex er tilgængelige på engelsk, tysk og fransk. Skulle De ønske yderligere oplysninger om håndtering af Ex produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.

I
Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese, tedesco e francese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

E
Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés, alemán y francés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.

NL
Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels, Duits en Frans. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.

SF
Kaikkien ATEX Ex -tyyppisten tuotteiden käyttöhjeet ovat saatavilla englannin-, saksan- ja ranskankielisinä. Mikäli tarvitsette Ex -tyyppisten tuotteiden ohjeita omalla paikallisella kielellännne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.

P
Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês, Alemão e Francês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.

F
Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise, allemande et française. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.

D
Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch, Deutsch und Französisch zur Verfügung. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichen Yokogawa-Vertreter in Verbindung.

S
Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska, tyska och franska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.

GR
Όλα τα εγχειρίδια λειτουργίας των προϊόντων με ATEX Ex διατίθενται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπρόσωπο της.

SK
Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom, nemeckom a francúzskom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.

CZ
Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.

LT
Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø, vokieèiø ir prancûzø kalbomis. Norëdami gauti prietaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës "Yokogawa" biuru arba atstovu.

LV
Visas ATEX Ex kategorijas izstrâdâjumu Lietoðanas instrukcijas tiek piegâdâtas angïu, vâcu un franèu valodâs. Ja vçlaties saòemt Ex ierîèu dokumentâciju citâ valodâ, Jums ir jâsazinâs ar firmas Jokogava (Yokogawa) tuvâko ofisu vai pârstâvi.

EST
Kõik ATEX Ex toodete kasutamisjuhendid on esitatud inglise, saksa ja prantsuse keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima lokagava (Yokogawa) kontori või esindaja poole.

PL
Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja. obsługi w Państwa lokalnym ję zyku, prosimy o kontakt z najbliższym biurem Yokogawy.

SLO
Vsi predpisi in navodila za ATEX Ex sorodni pridelki so pri roki v angliščini, nemščini ter francoščini. Če so Ex sorodna navodila potrebna v vašem tukejnjem jeziku, kontaktirajte vaš najbliši Yokogawa office ili predstaunika.

H
Az ATEX Ex mûszerek gépkönyveit angol, német és francia nyelven adjuk ki. Amennyiben helyi nyelven kérik az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviseletet.

BG
Всички упътвания за продукти от серията ATEX Ex се предлагат на английски, немски и френски език. Ако се нуждаете от упътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.

RO
Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza, germana si franceza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.

M
Il-manwali kollha ta' l-istruzzjonijiet għal prodotti marbuta ma' ATEX Ex huma disponibbli bl-Ingliż, bil-Ġermaniż u bil-Franċiż. Jekk tkun teħtieġ struzzjonijiet marbuta ma' Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentan jew uffiċċju ta' Yokogawa.

2. Handling Cautions

This chapter provides important information on how to handle the transmitter. Read this carefully before using the transmitter.

EJX Series transmitters are thoroughly tested at the factory before shipment. When taking delivery of an instrument, visually check them to make sure that no damage occurred during shipment.

Also check that all transmitter mounting hardware shown in figure 2.1 is included. If the transmitter is ordered without the mounting bracket and the process connector, the transmitter mounting hardware will not be included. After checking the transmitter, carefully repack it in its box and keep it there until you are ready to install it.

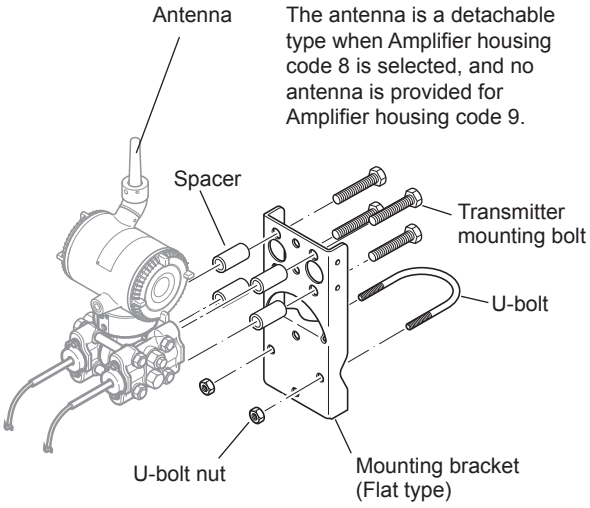

Antenna
The antenna is a detachable type when Amplifier housing code 8 is selected, and no antenna is provided for Amplifier housing code 9.
Spacer
Transmitter mounting bolt
U-bolt
U-bolt nut
Mounting bracket (Flat type)
F0201.ai

Figure 2.1 Transmitter Mounting Hardware

2.1 Model and Specifications Check

The model name and specifications are written on the name plate attached to the case.

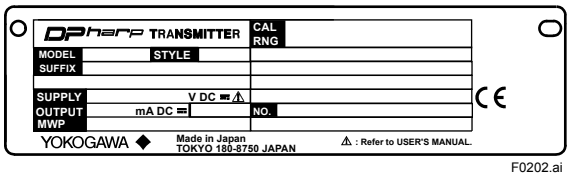


Figure 2.2 Name Plate

2.2 Unpacking

Keep the transmitter in its original packaging to prevent it from being damaged during shipment. Do not unpack the transmitter until it reaches the installation site.

2.3 Storage

The following precautions must be observed when storing the instrument, especially for a long period.

(a) Select a storage area which meets the following conditions:
- It is not exposed to rain or subject to water seepage/leaks.
- Vibration and shock are kept to a minimum.
- It has an ambient temperature and relative humidity within the following ranges.

Ambient temperature:
–40 to 85°C
–30 to 80°C LCD visible range
Relative humidity:
0% to 100% R.H.
Preferred temperature and humidity:
approx. 25°C and 65% R.H.

(b) When storing the transmitter, repack it carefully in the packaging that it was originally shipped with.

(c) If the transmitter has been used, thoroughly clean the chambers inside the cover flanges, so that there is no process fluid remaining inside. Before placing it in storage, also make sure that the pressure-detector is securely connected to the transmitter section.

(d) Preferably remove the batteries for storage. For maximum battery life, the storage temperature should not exceed 30°C.

NOTE

When storing the instrument with a battery pack, it is recommended to put the instrument in Deep Sleep mode to conserve the batteries. For details on how to switch to Deep Sleep mode, refer to subsection 8.3.16 “Switching to Deep Sleep Mode”.

2.4 Selecting the Installation Location

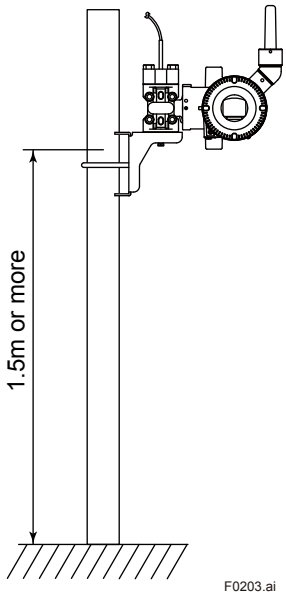
The transmitter is designed to withstand severe environmental conditions. However, to ensure that it will provide years of stable and accurate performance, take the following precautions when selecting the installation location.

(a) Wireless Communication

NOTE

The installation location of this transmitter must meet the following conditions:

- Adjust the direction of the antenna to be in the upright position regardless of the orientation of this transmitter. See section 4 for adjusting the antenna.
- Install the transmitter at least 1.5m above the ground or floor.



- Ensure that there are no obstacles such as walls or pipes within a 30-cm radius of each antenna.
- Confirm that each field wireless equipment compliant with ISA100.11a can see the antenna of other devices which locate within its own communication range. In the star topology network, the visibility to the antenna of gateway is a mandatory clause.

(b) Ambient Temperature
Avoid locations subject to wide temperature variations or a significant temperature gradient. If the location is exposed to radiant heat from plant equipment, provide adequate thermal insulation and/or ventilation.

(c) Ambient Atmosphere
Do not install the transmitter in a corrosive atmosphere. If this cannot be avoided, there must be adequate ventilation.

(d) Shock and Vibration
Although the transmitter is designed to be relatively resistant to shock and vibration, an installation site should be selected where this is kept to a minimum.

(e) Installation of Explosion-protected Transmitters
An explosion-protected transmitters is certified for installation in a hazardous area containing specific gas types. See subsection 2.8 “Installation of an Explosion-Protected Transmitters.”

2.5 Pressure Connection

WARNING

- Never loosen the process flange bolts when an instrument is installed in a process. The device is under pressure, and a loss of seal can result in a sudden and uncontrolled release of process fluid.
- Since the accumulated process fluid may be toxic or otherwise harmful, take appropriate steps to prevent the contact of such fluids with the skin or eyes and the inhalation of vapors from these fluids even after dismounting the instrument from process line for maintenance.

The following precautions must be observed in order to safely operate the transmitter under pressure.

(a) Make sure that there are no leaks in the impulse piping.
(b) Never apply a pressure higher than the specified maximum working pressure.

2.6 Restrictions on Use of Radio Transceivers

IMPORTANT

Although the transmitter has been designed to resist high frequency electrical noise, if a radio transceiver is used near the transmitter or its external wiring, the transmitter may be affected by high frequency noise pickup. To test this, start out from a distance of several meters and slowly approach the transmitter with the transceiver while observing the measurement loop for noise effects. Thereafter use the transceiver outside the range where the noise effects were first observed.

2.7 Insulation Resistance and Dielectric Strength Test

Since the transmitter has undergone insulation resistance and dielectric strength tests at the factory before shipment, normally these tests are not required. If the need arises to conduct these tests, heed the following:

(a) Do not perform such tests more frequently than is absolutely necessary. Even test voltages that do not cause visible damage to the insulation may degrade the insulation and reduce safety margins.
(b) Never apply a voltage exceeding 500 V DC (100 V DC with an internal lightning protector) for the insulation resistance test, nor a voltage exceeding 500 V AC (100 V AC with an internal lightning protector) for the dielectric strength test.
(c) The procedure for conducting these tests is as follows:

• Insulation Resistance Test

1) Remove the battery pack. See subsection 9.4.6 for details on how to remove it.
2) Short-circuit the battery connection terminals in the terminal box.
3) Turn OFF the insulation tester. Then connect the insulation tester plus (+) lead wire to the shorted battery connection terminals and the minus (–) leadwire to the grounding terminal.
4) Turn ON the insulation tester power and measure the insulation resistance. The voltage should be applied as briefly as possible to verify that the insulation resistance is at least 20 MΩ.
5) After completing the test and being very careful not to touch exposed conductors disconnect the insulation tester and connect a 100 kΩ resistor between the grounding terminal and the short-circuiting battery connection terminals. Leave this resistor connected at least one second to discharge any static potential. Do not touch the terminals while it is discharging.

NOTE

When storing the instrument with a battery pack, it is recommended to put the instrument in Deep Sleep mode to conserve the batteries. For details on how to switch to Deep Sleep mode, refer to subsection 7.3.16 “Switching to Deep Sleep Mode”.

• Dielectric Strength Test

1) Remove the battery pack. See subsection 9.4.6 for details on how to remove it.
2) Short-circuit the battery connection terminals in the terminal box.
3) Turn OFF the dielectric strength tester. Then connect the tester between the shorted battery connection terminals and the grounding terminal. Be sure to connect the grounding lead of the dielectric strength tester to the ground terminal.
4) Set the current limit on the dielectric strength tester to 0.1 mA, then turn ON the power and gradually increase the test voltage from ‘0’ to the specified voltage.
5) When the specified voltage is reached, hold it for one minute.
6) After completing this test, slowly decrease the voltage to avoid any voltage surges.

NOTE

When storing the instrument with a battery pack, it is recommended to put the instrument in Deep Sleep mode to conserve the batteries. For details on how to switch to Deep Sleep mode, refer to subsection 7.3.16 “Switching to Deep Sleep Mode”.

2.8 Installation of an Explosion-Protected Instrument

If a customer makes a repair or modification to an intrinsically safe instrument and the instrument is not restored to its original condition, its intrinsically safe construction may be compromised and the instrument may be hazardous to operate. Please contact Yokogawa before making any repair or modification to an instrument.

CAUTION

This instrument has been tested and certified as being intrinsically safe. Please note that severe restrictions apply to this instrument's construction, installation, external wiring, maintenance and repair. A failure to abide by these restrictions could make the instrument a hazard to operate.

WARNING

The battery pack may be replaced in a hazardous area. The battery pack has surface resistivity greater than 1G ohm and must be properly installed in the enclosure of the transmitter. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

2.8.1 FM Approval

Caution for FM intrinsically safe type. (Following contents refer "DOC. No. IFM037-A20")

Note 1. Model EJX Series Differential, gauge and absolute pressure transmitters with optional code /FS17 are applicable for use in hazardous locations.

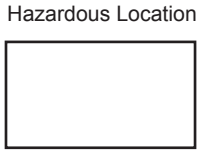
- Applicable Standard: FM3600, FM3610, FM3611, FM3810
- Intrinsically Safe for Class I, Division 1, Groups A, B, C & D. Class II, Division 1, Groups E, F & G and Class III, Division 1, Class I, Zone 0 in Hazardous Locations, AEx ia IIC
- Nonincendive for Class I, Division 2, Groups A, B, C & D. Class II, Division 2, Groups F & G and Class III, Division 1, Class I, Zone 2, Groups IIC, in Hazardous Locations.
- Enclosure: NEMA 4X (Indoors and outdoors)
- Temperature Class: T4
- Ambient temperature: -50 to 70°C

Note 2. Installation

- Installation should be in accordance with ANSI/ISA RP12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electric Code (ANSI/NFPA 70).
- Dust-tight conduit seal must be used when installed in a Class II, III, Group E, F and G environments.
- Note a warning label worded "SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY," and "INSTALL IN ACCORDANCE WITH DOC. No. IFM037-A20".

Note 3. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Intrinsically safe and Nonincendive Approval.



[Intrinsically Safe]	[Nonincendive]
Class I, II, III, Division 1, Groups A,B,C,D,E,F,G Class I, Zone 0 in Hazardous (Classified) Locations AEx ia IIC	Class I, II, Division 2, Groups A, B, C, D, F, G Class III, Division 1. Class I, Zone 2, Group IIC, in Hazardous (Classified) Locations

F0204.ai

Note 4. Battery Pack
USE ONLY YOKOGAWA BATTERY PACK F9915MA.

Note 5. Special Conditions for safe use
POTENTIAL ELECTROSTATIC CHARGING HAZARD-SECURE DISTANCE OF 100MM FROM ANTENNA.
DO NOT OPEN WHEN CL II, III, DIV 1,2 ATMOSPHERE IS PRESENT.

2.8.2 CSA Certification

Caution for CSA Intrinsically safe type. (Following contents refer to "DOC No. ICS030")

Note 1. Model EJX Series differential, gauge, and absolute pressure transmitters with optional code /CS17 are applicable for use in hazardous locations
Certificate: 2325443

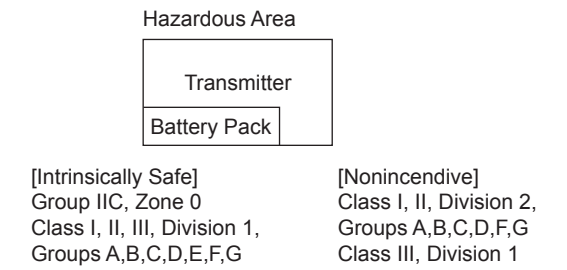
- Applicable standard: CAN/CSA-C22.2 No.0, CAN/CSA-C22.2 No.0.4, C22.2 No.25, CAN/CSA-C22.2 No.94, CAN/CSA-C22.2 No.157, C22.2 No.213, CAN/CSA-C22.2 No.61010-1, CAN/CSA- C22.2 No.60079-0, CAN/CSA-E60079-11, IEC60529
- Ex ia IIC T4
- Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1
- Nonincendive for Class I, Division2, Groups A, B, C & D, Class II, Division2, Groups F & G, Class III, Division1
- Enclosure: IP66/IP67 and Type 4X
- Temperature Code: T4
- Ambient Temperature: –50 to 70°C
- Max. Process Temp.: 120°C

Note 2. Installation

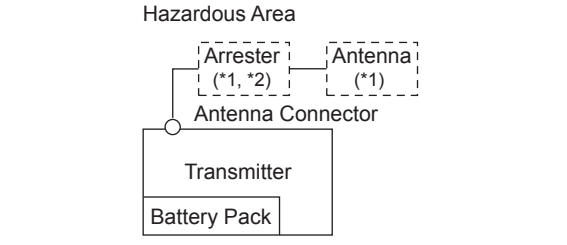
- Installation should be in accordance with Canadian Electrical Code Part I and Local Electrical Code.
- Do not alter drawing without authorization from CSA.
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Canadian Standards Intrinsically safe and nonincendive Certification.

[Installation Diagram]

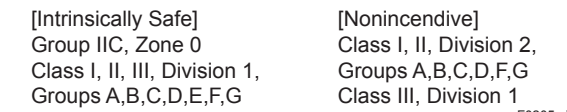
Amplifier housing code 7



Amplifier housing code 8 and 9



*1: These apparatus are simple apparatus.
*2: Arrester may not be connected.



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Note 3. Battery Pack

- Use only YOKOGAWA battery pack F9915MA or F9915NS .

Note 4. Special Conditions for safe use

- Potential electrostatic charging hazard - secure distance of 100mm from antenna.

2.8.3 ATEX Certification

(1) Technical Data

Caution for ATEX Intrinsically safe type.

Note 1. Model EJX Series pressure transmitters with optional code /KS27 for potentially explosive atmospheres:

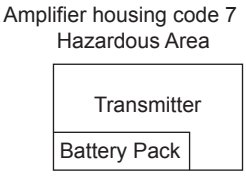
- No. KEMA 10ATEX0164 X
- Applicable Standard: EN 60079-0:2009, EN 60079-11:2012, EN 60079-26:2007
- Type of Protection and Marking code: Ex ia IIC T4 Ga
- Group: II
- Category: 1 G
- Ambient Temperature: –50°C to 70°C
- Process Temperature (Tp.): 120°C max.
- Enclosure: IP66/IP67

Note 2. Installation

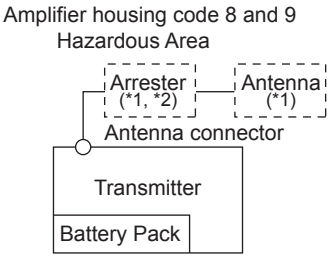
- Installation should be in accordance with local installation requirements. (Refer to the Control Drawing)

[Control Drawing]

Amplifier housing code 7



Amplifier housing code 8 and 9



*1: These apparatus are simple apparatus.
*2: Arrester may not be connected.

F0206.ai

Note 3. Battery Pack

- Use only YOKOGAWA battery pack F9915MA or F9915NS.

Note 4. Special conditions for Safe Use

- In case the enclosure of the Pressure Transmitter is made of aluminum, if it is mounted in an area where the use of category 1 G apparatus is required, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- For applications in explosive atmospheres caused by gases, vapors or mists and where category 1 G apparatus is required, electrostatic charges on the non-metallic parts of the Pressure Transmitter shall be avoided.

WARNING

Potential electrostatic charging hazard - secure distance of 100mm from antenna.

(2) Operation

WARNING

Take care not to generate mechanical sparking when access to the instrument and peripheral devices in a hazardous location.

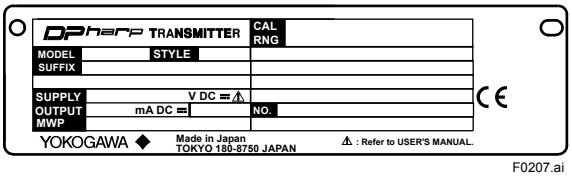
(3) Maintenance and repair

WARNING

The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void the certification.

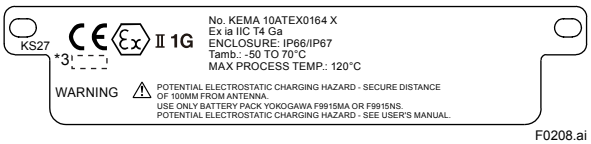
(4) Name Plate

- Name Plate



F0207.ai

- Tag plate for intrinsically safe type


KS27
*3
II 1G
No. KEMA 10ATEX0164 X
Ex ia IIC T4 Ga
ENCLOSURE: IP66/IP67
Tamb.: -50 TO 70°C
MAX PROCESS TEMP.: 120°C
WARNING
POTENTIAL ELECTROSTATIC CHARGING HAZARD - SECURE DISTANCE OF 100MM FROM ANTENNA.
USE ONLY BATTERY PACK YOKOGAWA F9915MA OR F9915NS.
POTENTIAL ELECTROSTATIC CHARGING HAZARD - SEE USER'S MANUAL.

F0208.ai

MODEL: Specified model code.
STYLE: Style code.
SUFFIX: Specified suffix code.
SUPPLY: Supply voltage.
OUTPUT: Output signal.
MWP: Maximum working pressure.
CAL RNG: Specified calibration range.
NO.: Serial number and year of production *1.
TOKYO 180-8750 JAPAN:
The manufacturer name and the address *2.

*1: The first digit in the final three numbers of the serial number appearing after "NO." on the nameplate indicates the year of production. The following is an example of a serial number for a product that was produced in 2010:

91K819857 032
↑
The year 2010

*2: "180-8750" is a zip code which represents the following address.
2-9-32 Nakacho, Musashino-shi, Tokyo Japan

*3: The identification number of Notified Body.

2.8.4 IECEx Certification

Caution for IECEx Intrinsically safe type.

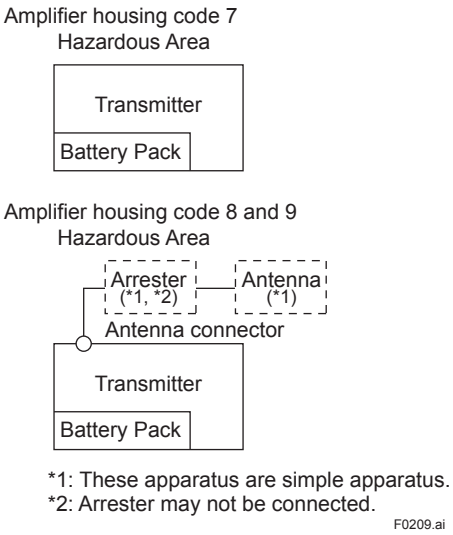
Note 1. Model EJX Series pressure transmitters with optional code /SS27 for potentially explosive atmospheres:

- No. IECEx KEM 10.0074X
- Applicable Standard: IEC 60079-0: 2011, IEC 60079-11:2011, IEC 60079-26: 2006
- Type of Protection and Marking code: Ex ia IIC T4 Ga
- Ambient Temperature: –50°C to 70°C
- Process Temperature (Tp.): 120°C max.
- Enclosure: IP66/IP67

Note 2. Installation

- Installation should be in accordance with local installation requirements. (Refer to the Control Drawing)

[Control Drawing]



Note 3. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void IECEx Intrinsically safe Certification.

WARNING

The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void the certification.

Note 4. Battery Pack

- Use only YOKOGAWA battery pack F9915MA or F9915NS.

Note 5. Special conditions for Safe Use

- In case the enclosure of the Pressure Transmitter is made of aluminum, if it is mounted in an area where the use of apparatus of equipment protection level Ga is required, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- For applications in explosive atmospheres caused by gases, vapors or mists and mounted in an area where the use of apparatus of equipment protection level Ga is required, electrostatic charges on the non-metallic parts of the Pressure Transmitter shall be avoided.

WARNING

- Potential electrostatic charging hazard - secure distance of 100mm from antenna.
- Take care not to generate mechanical sparking when access to the instrument and peripheral devices in a hazardous location.

2.9 EMC Conformity Standards

EN61326-1 Class A, Table 2 (For use in industrial locations), EN61326-2-3

CAUTION

This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

2.10 Pressure Equipment Directive (PED)

(1) General

EJX Series pressure transmitters are categorized as piping under the pressure accessories section of directive 97/23/EC, which corresponds to Article 3, Paragraph 3 of PED, denoted as Sound Engineering Practice (SEP).

(2) Technical Data

Article 3, Paragraph 3 of PED, denoted as Sound Engineering Practice (SEP).

(3) Operation

CAUTION

- The temperature and pressure of fluid should be maintained at levels that are consistent with normal operating conditions.
- The ambient temperature should be maintained at a level that is consistent with normal operating conditions.
- Please take care to prevent water hammer and the like from inducing excessive pressures in pipes and valves. If phenomena are likely, install a safety valve or take some other appropriate measure to prevent pressure from exceeding PS.
- Take appropriate measures at the device or system level to protect transmitters if they are to be operated near an external heat source.

2.11 Low Voltage Directive

Applicable standard: EN61010-1

(1) Pollution Degree 2

"Pollution degree" describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. " 2 " applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation must be expected.

(2) Installation Category I

"Overvoltage category (Installation category)" describes a number which defines a transient overvoltage condition. It implies the regulation for impulse withstand voltage. " I " applies to electrical equipment which is supplied from the circuit when appropriate transient overvoltage control means (interfaces) are provided.

2.12 Regulatory Compliance for Radio and Telecommunication

Please confirm that a installation region fulfils a standards, require additional regulatory information and approvals, contact to Yokogawa Electric Corporation.

2.12.1 Radio and Telecommunications Terminal Equipment Directive (R&TTE)

CE

We, Yokogawa Electric Corporation hereby declare that this equipment, model EJX-L series is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

The CE declaration of conformity for R&TTE for this product can be found at http://www.yokogawa.com/fld/

2.12.2 FCC compliance

This equipment contains transmitter module FCC ID: SGJ-WFC001.
This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.

Co-located:

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

FCC WARNING:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual,may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2.12.3 Industry Canada (IC) compliance

This equipment contains transmitter module IC: 8999A-WIC001.

This Class A digital apparatus complies with Canadian ICES-003.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired, operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter IC Number 8999A-WIC001 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna type:	Gain:
COLLINEAR	9 dBi, 50 Ω
Sleeve	2.14 dBi, 50 Ω

French:

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio IC Number 8999A-WIC001 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Antenne type:	Gain:
COLLINEAR	9 dBi, 50 Ω
Sleeve	2.14 dBi, 50 Ω

3. Component Names

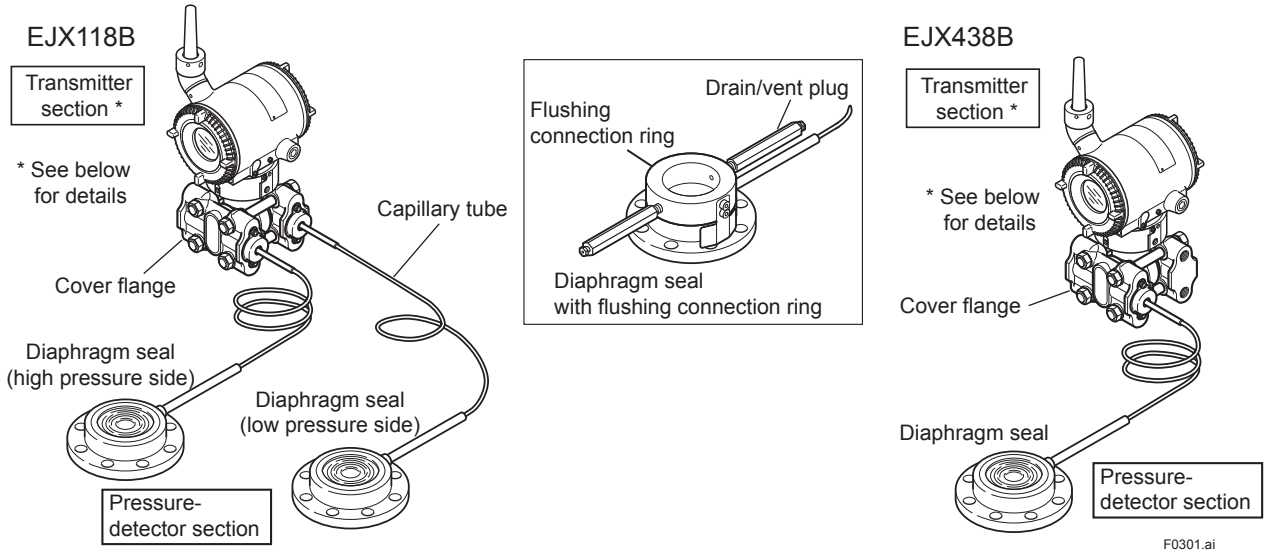
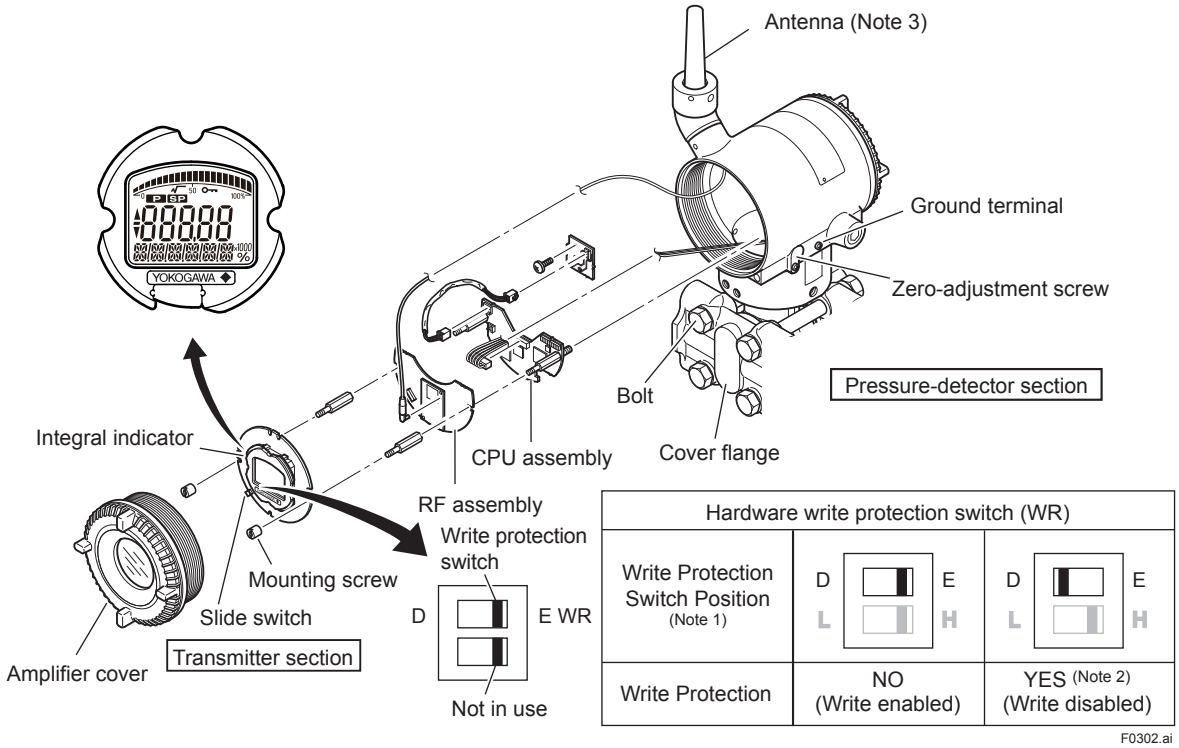


Figure 3.1 Component Names (External View of Flush type)



Note 1: Write Protection is set by sliding the hard write protection switch (WR) shown in figure. The hardware write protection switch is set to the E side (Write enable) for delivery. Set an unused switch to H side.
Note 2: When the switch is D side (write protection setting), provisioning is acceptable. For details of provisioning, refer to section 7.4 “Connecting to Field Wireless Network”.
Note 3: The detachable antenna is applied when the amplifier housing code 7 or 8 is specified.

Figure 3.2 Component Names (Details of Transmitter section)

Table 3.1 Display Symbol

Display Symbol	Meaning of Display Symbol
√	Display mode is ‘square root’. (Display is not lit when ‘linear’ mode.)
▲	The output signal being zero-adjusted is increasing.
▼	The output signal being zero-adjusted is decreasing.
o-r	Write protect function is enabled.

4. Installation

4.1 Precautions

Before installing the transmitter, read the cautionary notes in section 2.4, “Selecting the Installation Location.” For additional information on the ambient conditions allowed at the installation location, refer to subsection 10.1 “Standard Specifications.”

NOTE

To connect this transmitter to the field wireless network, information on connecting to field wireless devices needs to be set beforehand. Refer to 6.4 “Connecting to the Field Wireless Network.”

IMPORTANT

- When welding piping during construction, take care not to allow welding currents to flow through the transmitter.
- Do not step on this instrument after installation.
- For the EJX438B, there is a small hole in the low pressure side cover flange that is used to measure the atmospheric pressure. The hole must not face upward. See section 10.4, “Dimensions,” for the location of the hole.
- Never loosen the four bolts securing the cover flanges (Refer to figure 3.2.) If the seal liquid leaks, the transmitter cannot be used.

4.2 Mounting the Diaphragm Seals

Mount the diaphragm seals using the flanges as shown in Figure 4.1. Figure 4.2 and Figure 4.3 shows how to mount the diaphragm seals on a tank. The mating flange, gasket, bolts and nuts are to be procured by the customer.

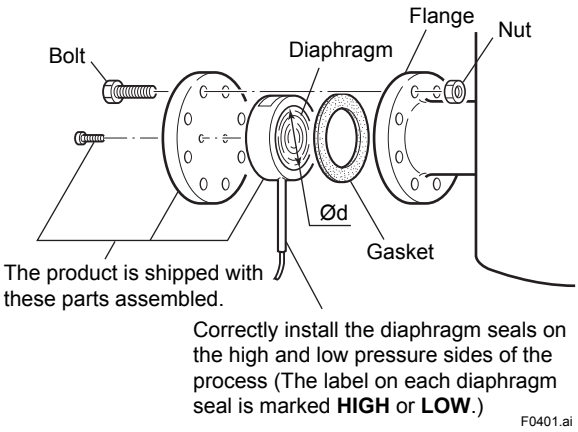

Flange
Nut
Bolt
Diaphragm
Ød
Gasket
The product is shipped with these parts assembled.
Correctly install the diaphragm seals on the high and low pressure sides of the process (The label on each diaphragm seal is marked **HIGH** or **LOW**.)
F0401.ai

Figure 4.1 Mounting the Diaphragm Seals

IMPORTANT

Please use a gasket with an inside diameter (ød) that is greater than the diameter of the diaphragm seal. If a gasket with a smaller inside diameter is used, the diaphragm may not function correctly. (Refer to Subsection 10.4 ‘Dimensions’)

IMPORTANT

- When measuring the liquid level of the tank, the minimum liquid level (zero point) must be set to a level at least 50 mm above the center of the high pressure side diaphragm seal (see Figure 4.2).
- Correctly install the diaphragm seals on the high and low pressure sides of the process, checking the label on each seal.
- To avoid measuring error duets temperature difference between the two diaphragm seals, capillary tube must be bound together. The capillary tube must be securely fixed to the tank wall to prevent movement by wind or vibration. If the capillary tube is too long, loosely coil the extra tube portion (coil diameter of 300 mm or more) and secure the coiled tube with a clamp.
- During the diaphragm seal installation, ensure as far as possible that no seal liquid head pressure is applied to the diaphragm seals.
- Exercise care so as not to damage diaphragm surfaces. Since the diaphragm protrudes approx. 1 mm from the flange surface, do not place the pressure detector section face down on a surface as this can damage the diaphragm.
- Do not sharply bend or twist capillary tube or apply excessive stress to them.

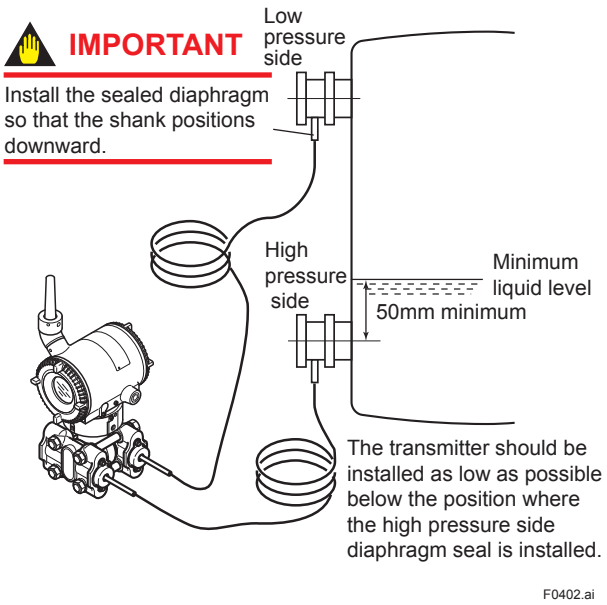

IMPORTANT
Install the sealed diaphragm so that the shank positions downward.
Low pressure side
High pressure side
Minimum liquid level
50mm minimum
The transmitter should be installed as low as possible below the position where the high pressure side diaphragm seal is installed.
F0402.ai

Figure 4.2 Installing the Diaphragm Seals to a Tank (differential pressure transmitter)

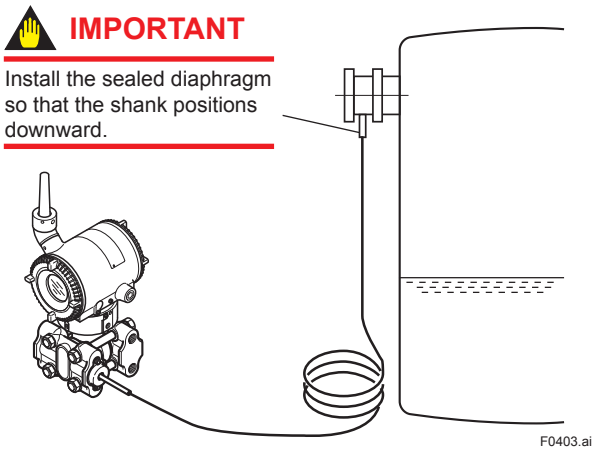


Figure 4.3 Installing the Diaphragm Seals to a Tank (pressure transmitter)

4.3 Transmitter Mounting

- The transmitter can be mounted on a nominal 50 mm (2-inch) pipe using the mounting bracket supplied, as shown in Figure 4.4. The transmitter can be mounted on either a horizontal or a vertical pipe.

■ When mounting the bracket on the transmitter, tighten the (four) bolts that hold the transmitter to a torque of approximately 39 N·m {4 kgf·m}.

IMPORTANT

- The transmitter should be installed at least 600 mm below the high pressure (HP) process connection to ensure a positive head pressure of fill fluid. Pay special attention to vacuum applications.
  Refer to "When the transmitter can't be installed at least 600 mm below the HP process connection" if the transmitter can't be installed at least 600 mm below.
- Never loosen the four bolts securing the cover flange or the screws at the joints between the capillary tube and cover flanges (Refer to figure 3.2.) If the seal liquid leaks, the transmitter cannot be used.

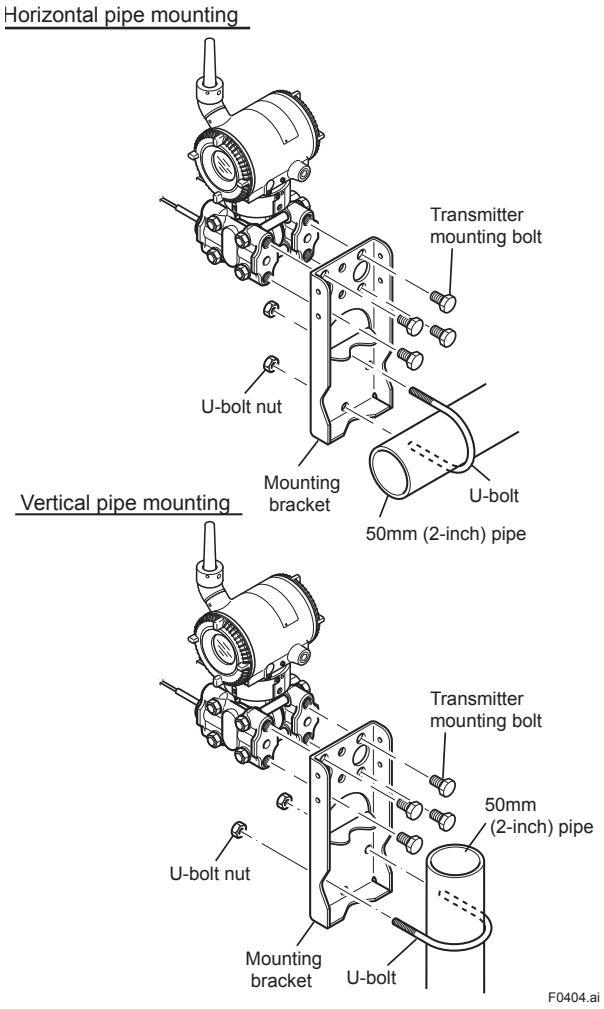


Figure 4.4 Transmitter Mounting

■ When the transmitter can't be installed at least 600 mm below the HP process connection.

IMPORTANT

The transmitter should be installed at least 600 mm below the high pressure (HP) process connection to ensure a positive head pressure of fill fluid. Pay special attention to vacuum applications.
If it can not be installed at least 600 mm below the HP process connection, please use the equation below:

$$h = \frac{(P - P0) \times dHg}{ds} \times 7.5 \times 10^{-3} \text{ [mm]}$$

h: Vertical height between the HP process connection and the transmitter (mm)
h≤0: Install the transmitter at least h (mm) below the HP process connection
h>0: Install the transmitter at most h (mm) above the HP process connection
P: Pressure in the tank (Pa abs)
P0: Minimum working pressure limit of the transmitter (Pa abs) If the ambient temperature range is –10 to 50°C.
2951 (Wetted parts material code SW, SE and SY)
3185 (Wetted parts material code TW)
4573 (Wetted parts material code HW)
3810 (Wetted parts material code UW)
ds: Specific gravity of fill fluid (at 25°C), refer to table 10.1 on section 10.1 General Specifications.
dHg:Specific gravity of the Mercury 13.6 (at 25°C)

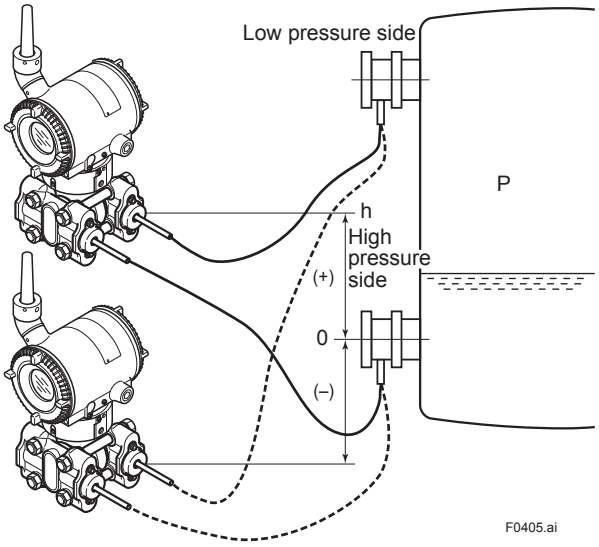


Figure 4.5 Example of Installation to Tank for Differential Pressure Transmitter (Caution on Installation)

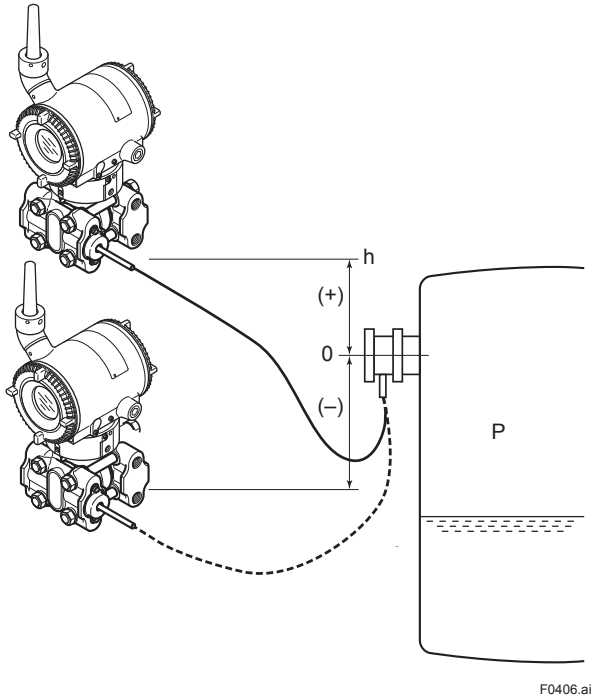


Figure 4.6 Example of Installation to Tank for Gauge Pressure Transmitter (Caution on Installation)

4.4 Mounting the Flushing Connection Ring

4.4.1 Mounting to Pressure Detector Section

The flushing connection ring is mounted to the pressure detector section as shown in Figure 4.7. At the factory shipment, the flushing connection ring is already assembled and attached to process detector section.

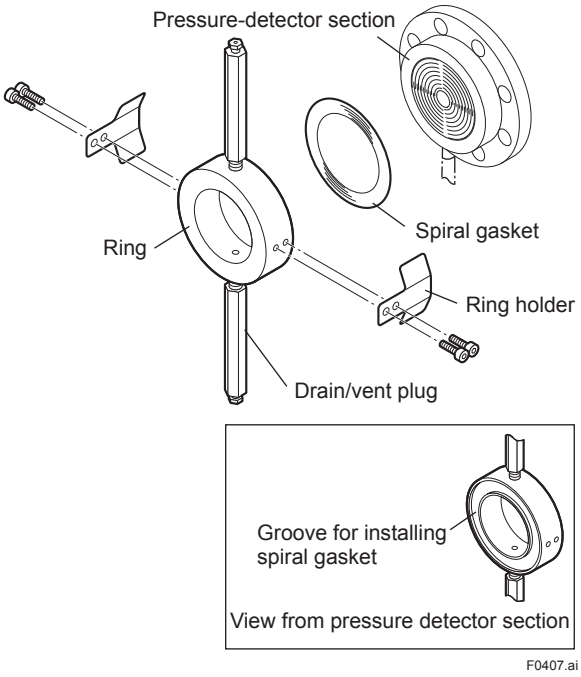


Figure 4.7 Mounting to Pressure Detector Section

(1) Mount the ring holder on the ring and loosely tighten the mounting screws.
(2) Place the spiral gasket in the ring groove. With the ring correctly aligned and flush with the face of the pressure detector, securely tighten each ring holder's mounting screws.
(3) Position the ring so that the drain/vent plugs are aligned straight up and down.

4.4.2 Mounting to Process Flange

Tighten the bolts to completely close the gap between the ring and the pressure detector section. The mating flange, gasket, stud bolts and nuts are to procured by the customer.

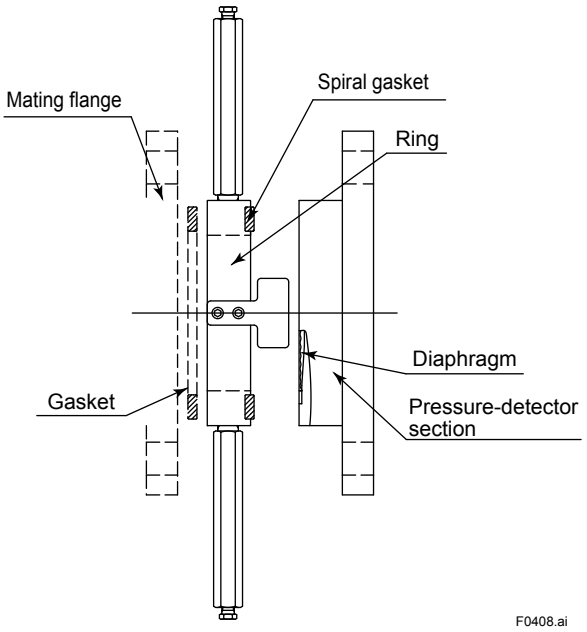


Figure 4.8 Mounting to Process Flange

IMPORTANT

- Confirm that there is no gap between the ring and the process-detector section after they are mounted on the process flange. A gap can lead to a sudden, explosive release of process fluids.
- When mounting or removing the ring, take care not to tilt the pressure detector downward as the ring can slip off and cause injury.
- When re-mounting the ring, use the new spiral gasket as shown in below table.

Table 4.1 Spiral Gasket for Pressure Detector Section Side*

Part number	Size	Description
F9350SV	ø100×ø120×t4.5	For 3-inch flange
F9970XF	ø100×ø120×t4.5	For 3-inch flange**
F9350ST	ø70×ø90×t4.5	For 2-inch flange
F9970XD	ø70×ø90×t4.5	For 2-inch flange**
F9346ZH	ø60×ø75×t4.5	For 1 1/2-inch flange
F9970XB	ø60×ø75×t4.5	For 1 1/2-inch flange**

*: Material; 316SST (Hoop), PTFE Teflon (Filler)
**: For oil-prohibited use (Option code: /K1, /K5)

4.5 Affixing the Teflon Film

The FEP Teflon option includes a teflon film and fluorinated oil.
Before mounting the diaphragm seal to the process flange, affix the teflon film as follows:

IMPORTANT

1) Position the diaphragm seal so that the diaphragm is in a upward position.
2) Pour the fluorinated oil on the diaphragm and gasket area covering it completely and evenly. Be careful not to scratch the diaphragm or change the its shape.
3) Affix the teflon film over the diaphragm and gasket area.
4) Next, carefully inspect the cover and try to identify any entrapped air between the diaphragm and the teflon film. The air must be removed to ensure optimum performance. If air pockets are present, use your fingers to remove the air by starting at the center of the diaphragm and work your way out.
5) Position the gasket on the Teflon film.
6) Mount the transmitter onto the process flange.

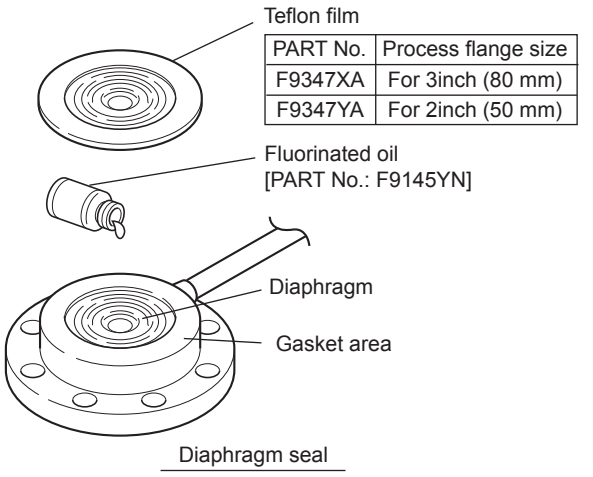


Figure 4.9 Affixing the Teflon Film

4.6 Rotating Transmitter Section

WARNING

Intrinsic safe type transmitters must be, as a rule, do not rotate transmitter section if it is powered. In case you need to rotate when the transmitter is powered, using gas detector and confirm no existence of explosive gas before rotating.

The transmitter section can be rotated approximately 360° (180° to either direction or 360° to one direction from the original position at shipment, depending on the configuration of the instrument.) It can be fixed at any angle within above range.

1) Remove the five setscrews that fasten the transmitter section and capsule assembly, using the Allen wrench.
2) Rotate the transmitter section slowly and stop it at designated position.
3) Tighten the five setscrews to a torque of 1.5 N·m.

IMPORTANT

Do not rotate the transmitter section more than the above limit.

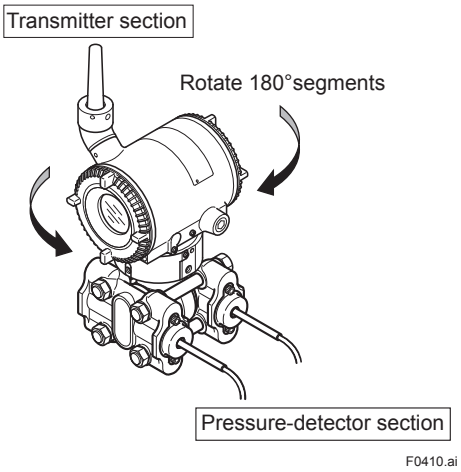


Figure 4.10 Rotating Transmitter Section

4.7 Changing the Direction of Integral Indicator

WARNING

Intrinsic safe type transmitters must be, as a rule, remove a battery pack in non-hazardous area before open/close the Amplifier Cover or disassembling and reassembling the Integral Indicator.

An integral indicator can be rotated in four positions at 90°. Follow the instructions in section 8.4.1 for removing and attaching the integral indicator.

4.8 Changing the direction of the antenna

Adjust the direction of the antenna to be in the upright position. Figure 4.11 shows factory setup antenna position. If the transmitter is installed to vertical impulse piping, follow the procedure below and change the antenna position.

1) Loosen the two mounting screws at the bottom of the antenna by using a 2.5 mm Allen wrench (see Figure 4.11).
   The screws might come off and be lost if loosened too much; loosen the screws by about three rotations.
2) Press forward and down 90 degrees by rotating the axis at the bottom of the antenna.
3) Tighten the two screws to a torque of 1.5 N·m by using a torque wrench. When doing this, be careful not leave a gap between the antenna and housing.

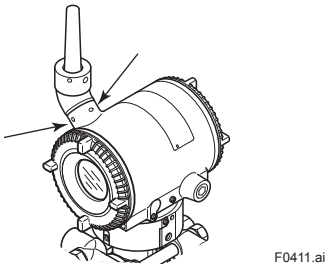


Figure 4.11 Mounting Screw Position

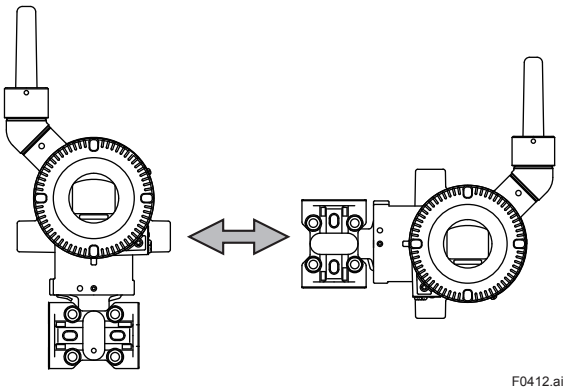


Figure 4.12 Adjusting Antenna Position

5. Wiring

5.1 Mounting Antenna and Wiring

For Amplifier housing code 8 and 9, an antenna is not attached to the transmitter. The following provides the instructions for mounting the antenna and installing the remote antenna and wiring using antenna extension cable.

IMPORTANT

The antenna connector is covered with a cap at the time of delivery. Keep the cap attached until the installation of the antenna or antenna cables to protect the inside connection part. The unscrewed cap should be stored in order to replace it immediately after the antenna or antenna cables are removed.

CAUTION

To maintain the ultimate conditions of radio-frequency signal, protect the connectors of antenna, extension antenna cable, and arrester from the corrosive atmosphere by the following treatment.

1. Clean the connection to be protected.
2. Wind the butyl rubber self-bonding tape around the connection. See the manual of the tape about the winding.
3. To protect the butyl rubber self-bonding tape from the environment such as ultraviolet rays and so on, wind vinyl tape (or a vinyl type self-bonding tape) on it.

5.1.1 Mounting the antenna

Screw the provided antenna into the antenna connector of the transmitter. The antenna may be sold as available accessories and supplied separately.

1. Unscrew the antenna connector cap on the antenna connector.
2. Screw the provided antenna into the antenna connector. Tighten the antenna connector with a torque of 2 to 3 N·m.

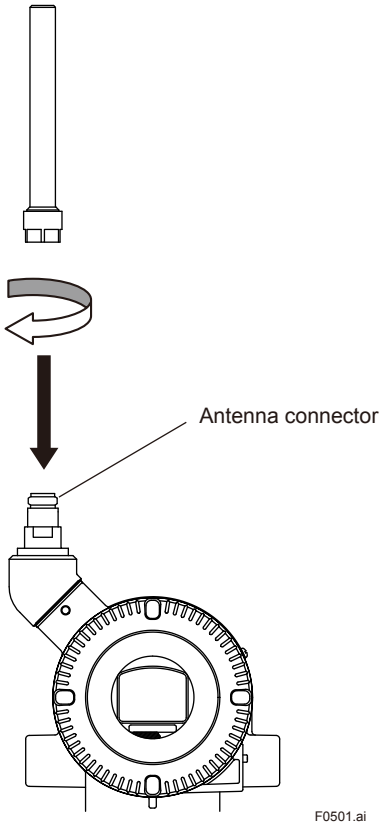


Figure 5.1 Mounting the antenna

CAUTION

When installing the antenna, screw the antenna by tightening the lower nut part. Screwing the antenna by holding the antenna body may cause failure such as cable disconnection. The same manner should be taken when unscrewing the antenna.

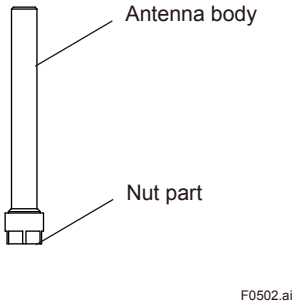


Figure 5.2 Antenna

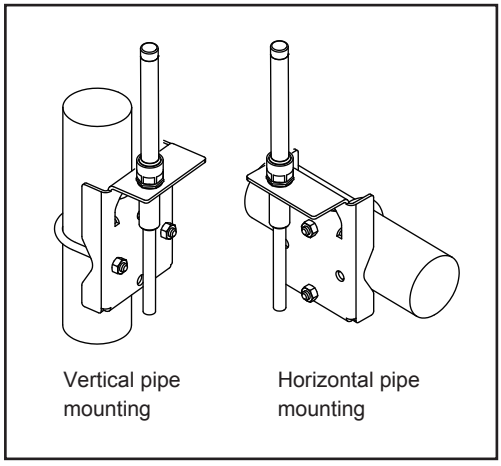
5.1.2 Mounting External Antenna and Wiring Antenna Extension Cable

5.1.2.1 Mounting of External Antenna

Mount the external antenna at the proper location according to the wireless environment described in 2.4 Selecting the Installation Location. The mounting to the pipe such as 50 mm (2-inch) pipe needs to secure the enough strength to endure a strong wind, vibration and so on. The antenna must be mounted vertically.

■ **Fixing of External Antenna**

Fix an external antenna appropriately using the bracket provided as the external antenna option to 50 mm (2-inch) pipe.



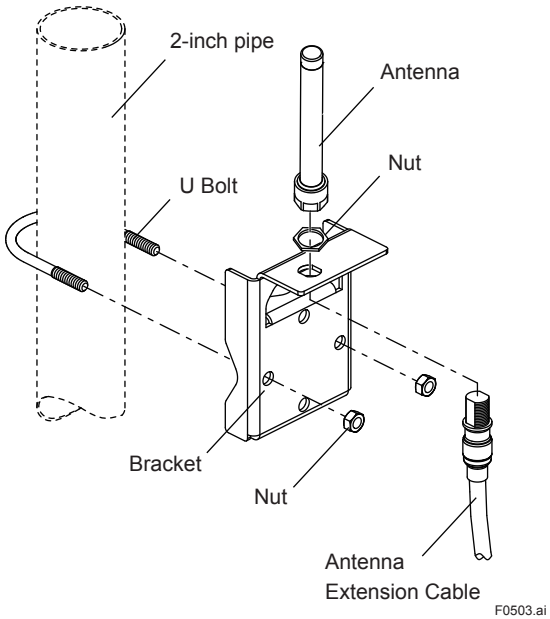


Figure 5.3 Fixing the remote antenna

■ **Mounting Procedure of External Antenna**

1. Fix the bracket by U-bolt and nut to 50 mm (2-inch) pipe.
2. Fix the antenna extension cable to the bracket 1 using the provided nut with a torque of 6 to 7 N·m as shown in the Figure 5.3 above. Use the nut which is attached to the antenna extension cable.
3. Screw the antenna into the antenna connector of the antenna extension cable on the bracket 1.
   Tighten the antenna connector with a torque of 2 to 3 N·m.
4. Protect the connection as necessary. For details of the protection, see “5.1 Mounting Antenna and Wiring.”

5.1.2.2 Wiring of Antenna Extension Cable

1. Use the provided antenna extension cable to connect the antenna connector with the external antenna. Tighten the connector of the antenna extension cable with a torque of 2 to 3 N·m. The minimum bending radius while checking the wiring position should be more than 200 mm.
2. When using two extension cables, the provided arrester should be inserted between these cables.
3. Before the wiring work, confirm the polarities (male/female) of the connectors of antenna, extension antenna cable, and arrester. Tighten the connector of the antenna extension cable with a torque of 2 to 3 N·m.
4. Protect the connectors of antenna, extension antenna cable, and arrester as necessary. See “5.1 Mounting Antenna and Wiring.”
5. Fix the extension antenna cable to the appropriate structure to protect the cable from the vibration, wind, and so on. The minimum bending radius for fixing in the state maintained for a long period should be more than 80 mm.

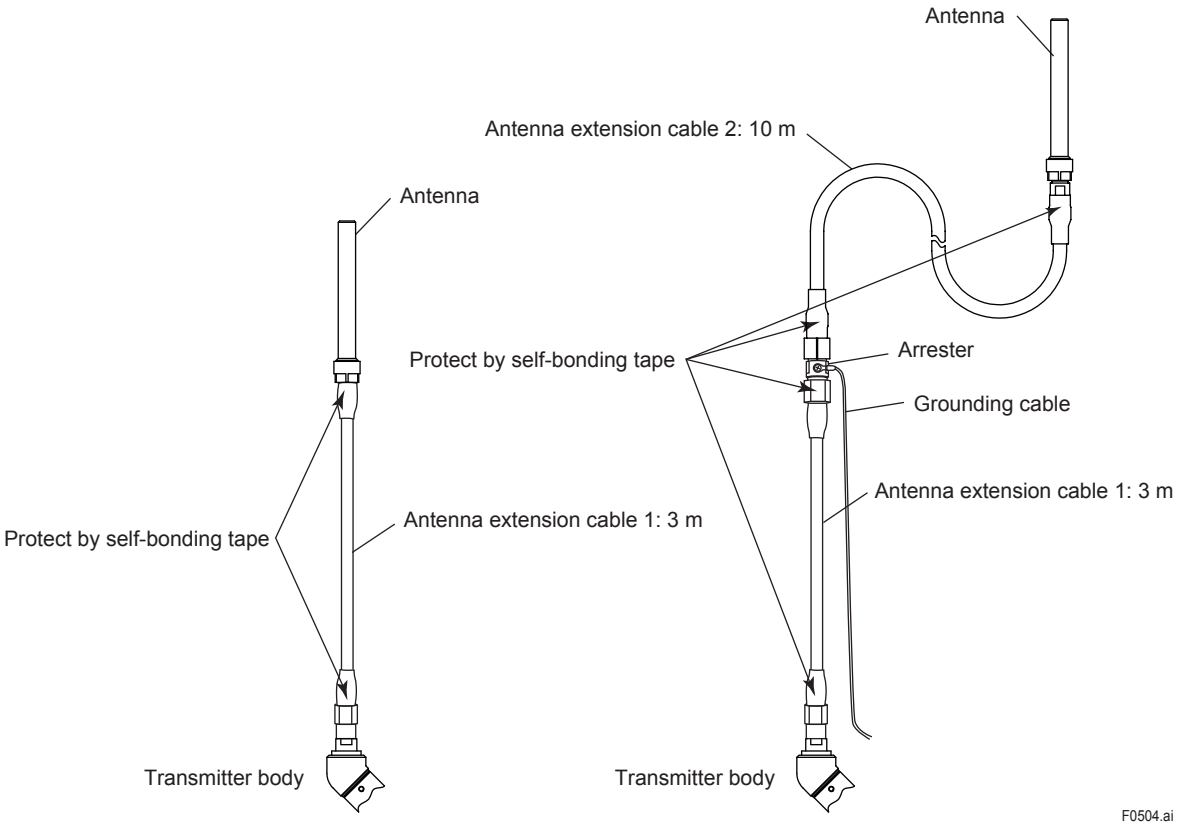


Figure 5.4 Wiring the antenna extension cable

CAUTION

Use the dedicated antenna extension cable provided by Yokogawa as accessories for the transmitters.

5.1.2.3 Mounting of Arrester and Wiring

Mount an arrester between the extension cables and connect the grounding cable to the grounding terminal of the arrester as required.

Connect the grounding cable to the grounding terminal on the transmitter body. Class C grounding with the grounding resistance of 10 Ω or less is necessary. Do not share the ground with other devices.

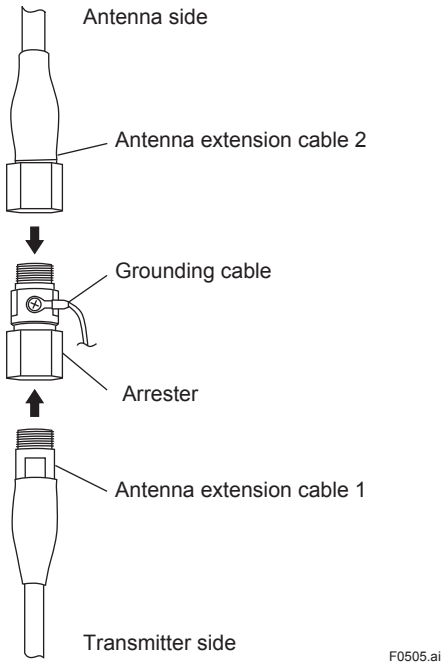


Figure 5.5 Connection of the arrester and antenna extension cable

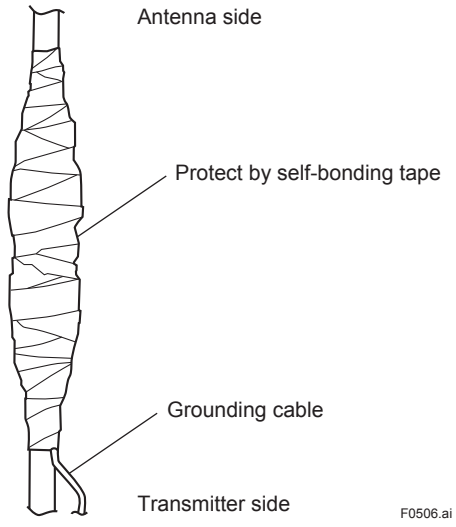


Figure 5.6 Arrester protection by self-bonding tape

5.2 Grounding

When using the antenna extension cable with an arrestor, Class C grounding with the grounding resistance of 10 Ω is required. Always ground the transmitter case in accordance with national and local electrical codes. The most effective transmitter case grounding method is a direct connection to earth ground with minimal impedance.

CAUTION

Grounding is recommended for safe operation.

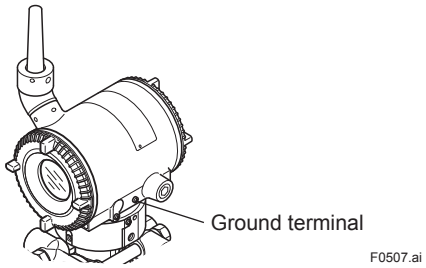


Figure 5.7 Ground Terminal

6. Operation

6.1 Preparation for Starting Operation

This section describes the operation procedure for the EJX118B as shown in Figure 6.1 when measuring liquid level in a closed tank, and EJX438B as shown in Figure 6.2 when measuring pressure in a tank.

NOTE

It is required to set security and network information to enable the transmitter to be connected to the Field Wireless Network. For more details, refer to section 6.4 “Connecting to the Field Wireless Network”.

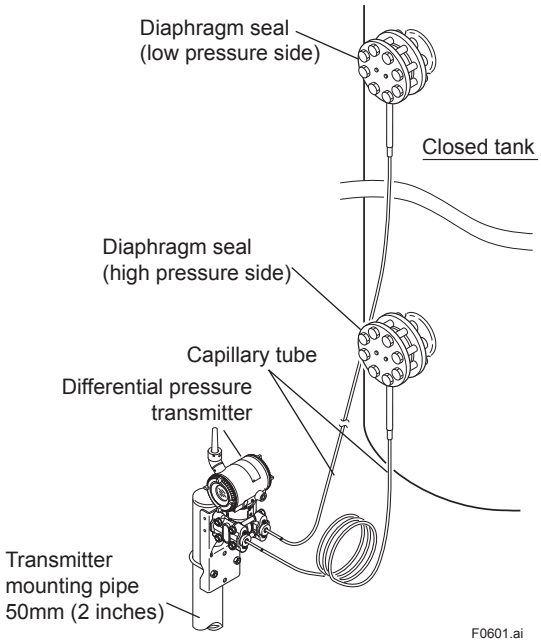


Figure6.1 Liquid Level Measurement in a Closed Tank

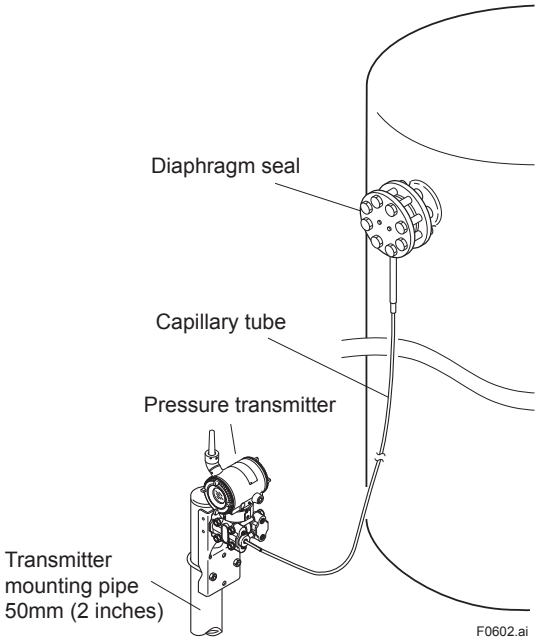


Figure 6.2 Pressure Measurement

(a) Confirm that there is no leak in the connecting part of each diaphragm seal mounting flange.

(b) Insert batteries into the battery case, and install to the transmitter. To insert batteries into the battery case, be careful to polarity of batteries and battery case. For details of Installation of battery, refer to section 8.4.4 and 8.4.5. Battery case is installed in the transmitter when shipped from the factory, however, batteries are sold separately and not included.

(c) Using the device configuration tool, confirm that the transmitter is operating properly. Check parameter values or change the setpoints as necessary.

Integral Indicator’s indication can be used to confirm that the transmitter is operating properly. For details on how to confirm, refer to subsection 7.4 “Self-Diagnostics”.
ISA100 devices display self-diagnostic information in an easy-to-understand manner using four categories (Check function, Maintenance required, Failure, and Off specification) according to NAMUR NE107*.

* NAMUR NE107 “Self-Monitoring and Diagnosis of Field Devices”

■ **Confirm that transmitter is operating properly by integral indicator.**

- If the transmitter is faulty, an error code is displayed.

Self-diagnostic error on integral indicator
(Faulity transmitter)

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Figure 6.3 Integral Indicator with Error Code

NOTE

If any of the above errors are indicated on the display of the integral indicator or the device configuration tool, refer to subsection 8.5.3 for the corrective action.

■ **Verify and Change Transmitter Parameter Setting and Values**

The parameters related to the following items are minimum required to be set for operation, and set at factory as specified in order. Confirm or change the parameters if needed.

- Measurement range(measurement lower/upper limit, unit)
- Output (Non linearization mode / Sq root mode)

6.2 Zero Point Adjustment

After completing preparations for operating the transmitter, adjust the zero point. There are two zero point adjusting ways.

IMPORTANT

Do not turn off the power to the transmitter immediately after performing a zero point adjustment. Powering off within 30 seconds of performing this procedure will return the zero point to its previous setting.

(1) When you can obtain the Low Range Value from the actual measured value of 0% (0 kPa, atmospheric pressure);

■ **Using the transmitter's zero-adjustment screw**

Before adjusting zero point, make sure followings.

- The External zero trim parameter (External Zero Trim) is "Trim on". For details, refer to section 7 "Setting Parameters".
- Use a slotted screwdriver to turn the zero adjustment screw. Turn the screw clockwise to increase the output or counterclockwise to decrease the output.
- The zero point adjustment can be made with a resolution of 0.01% of the setting range. The degree of zero adjustments varies with the screw turning speed; turn the screw slowly to make a fine adjustment, quickly to make a rough adjustment.

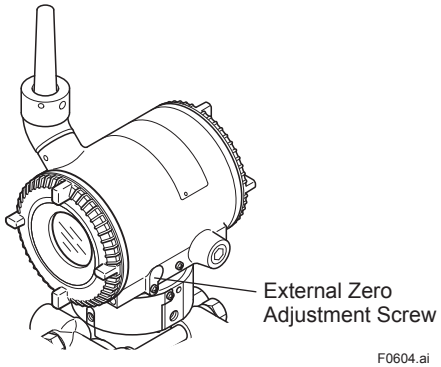

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Figure 6.4 External Zero Adjustment Screw

■ **Using the Device Configuration Tool**

Refer to subsection 7.3.14 “Zero-point Adjustment and Span Adjustment”.

(2) When you cannot obtain the Low Range Value from the actual measured value of 0%;

Adjust the transmitter output to the actual measured value obtained by a glass gauge, etc.

[Example]
The measuring range of 0 to 2m; the actual measured value of 0.8m

$$\text{Actual measured value} = \frac{0.8}{2} \times 100 = 40.0\%$$

■ **Using the transmitter’s zero-adjustment screw**

Turn the zero adjustment screw to match the output signal to the actual measured value.

■ **Using the Device Configuration Tool**

Refer to subsection 7.3.14 ”Zero Point Adjustment and Span Adjustment”.

6.3 Starting Operation

After completing the Zero Point Adjustment, follow the procedure below to start operation.

1) Confirm the operating status.
2) After confirming the operating status, perform the following:

IMPORTANT

- Close the terminal box cover and the amplifier cover. Screw each cover in tightly until it will not turn further.
- Tighten the zero-adjustment cover mounting screw to secure the cover.

6.4 Connecting to the Field Wireless Network

■ **Preparation work prior to connecting to a Field Wireless Network**

This transmitter does not need to be connected with a physical wire. Instead of physical wiring, it is necessary to set the field wireless devices to communicate with before installing the transmitter. This procedure is called a provisioning.
This transmitter supports provisioning via infrared communication using a provisioning device and can be securely connected to a network. If the provisioning information is not set, the transmitter cannot be connected to the field wireless network.

Provisioning:

Provisioning is work to set the security and network information to enable the transmitter to be connected to the field wireless network. This transmitter supports a provisioning method using infrared communication.

For details on provisioning using a provisioning device, and procedure for connecting the transmitter to the Field Wireless Network, refer to the User’s Manual, FieldMate Versatile Device Management Wizard (IM 01R01A01-01E), YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN) and YFGW410 Field Wireless Management Station (IM 01W02D01-01EN).

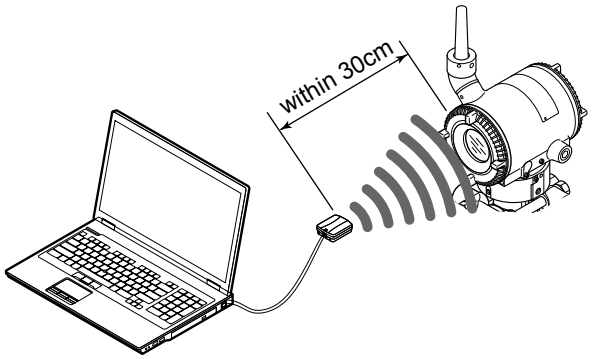

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Figure 6.5 Provisioning Example

■ Provisioning work

This subsection describes provisioning work using FieldMate as the provisioning device.
Provisioning work performs provisioning for each field wireless device using FieldMate and an infrared adapter.
If Yokogawa-recommended infrared device is used for provisioning, distance between the transmitter glass window and the infrared device should be within 30cm. For details of Yokogawa-recommended infrared device, refer to subsection 8.2 “Calibration Instruments Selection”. Perform the following provisioning tasks.

- Setting provisioning information
- Creating a provisioning information file

1) Setting provisioning information
Set the device tag and network ID using a FieldMate provisioning function. The device tag, network ID, and join key are set in the field wireless device. It is not necessary to input a join key because FieldMate automatically generates it.

Setting device tag
The device tag is used for the user to recognize the Field Wireless Device.

Setting network ID
This is the network ID for the field wireless network to which the field wireless device is connected. Set a value from 2 to 65535.
The field wireless device is connected to the field wireless network corresponding to the network ID set by provisioning work.

2) Creating a provisioning information file
The following provisioned information is stored in the provisioning information file.

- Network ID
- Device tag
- EUI64
- Join key
- Provisioner (name of the user who performed provisioning work by FieldMate)
- Date (Time and date when provisioning was performed by FieldMate)
This provisioning information file is required to load from the Field Wireless Configurator to the Field Wireless Integrated Gateway. Store the file carefully.

■ Connecting to a field wireless network

The action after installing the battery pack varies depending on the silence setting.
Mounting the battery pack automatically starts a search for the field wireless network.
When the Field Wireless Integrated Gateway is found, the instrument enters the join status.
When the Field Wireless Integrated Gateway is not found and a specified time based on the silence mode has elapsed, a cycle of a one-hour pause and six-minutes search is repeated until the instrument can join the field wireless network.
For details on the procedure to switch to silence mode, refer to subsection 7.3.17 “Switching to Silence Mode.”

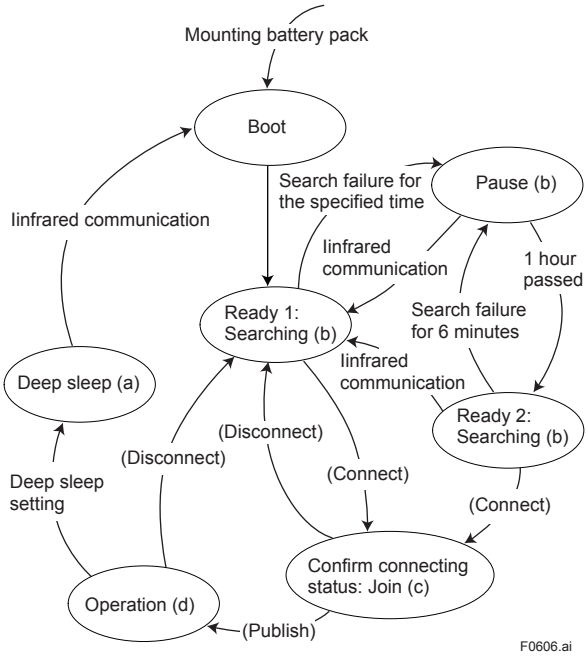
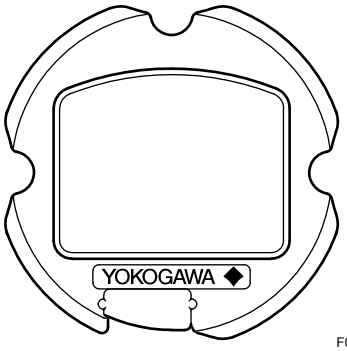


Figure 6.6 Wireless Connection Process

(a) Deep sleep



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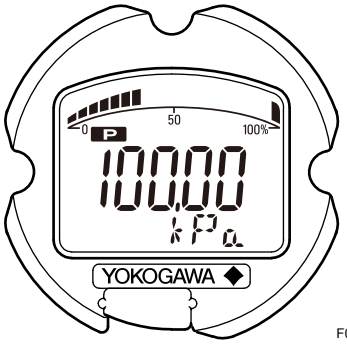
(b) Ready and pause



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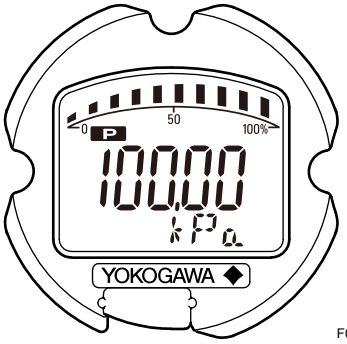
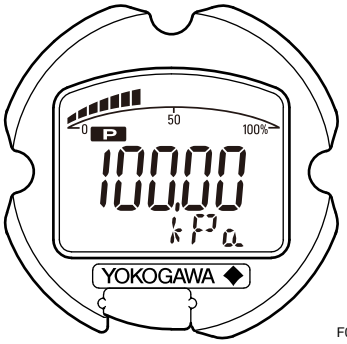
(c) Confirm connecting status



F0609.ai

(d) Join



F0610.ai

NOTE

If the transmitter searches the Field Wireless Network for long time at low ambient temperature condition, sometimes error “AL.70 LOWBAT” is displayed on the Integral Indicator. Even though using new batteries, it can occur. It occurs because of battery characteristics.
After joining to the Field Wireless Network, this error will be cleared within one hour if battery has no failure.

6.5 Shutting Down The Transmitter

When shut down the transmitter, remove the battery pack or set the transmitter to deep sleep mode by the Device Configuration Tool.

NOTE

Whenever shutting down the transmitter for a long period, detach the transmitter (diaphragm seals) from the tank

- Refer to subsection 8.4.4 “Replacing the Battery Pack” for the battery pack removing.
- When storing the instrument with a battery pack inserted, it is recommended to put the instrument into deep sleep mode to conserve battery power. For details on how to switch to deep sleep mode, refer to subsection 7.3.16 “Switching to the Deep Sleep Mode”.

6.6 Venting or Draining Transmitter Process-Detector Section

If condensate (or gas) collects in the transmitter process-detector section, the measured pressure may be in error. If it is not possible to configure the piping for self draining (or self-venting) operation, you will need to loosen the drain (vent) screw on the flushing connection ring to completely drain (vent) any stagnated liquid (gas).
However, since draining condensate or bleeding off gas gives the pressure measurement disturbance, this should not be done when the loop is in operation.

WARNING

Since the accumulated liquid (or gas) may be toxic or otherwise harmful, take appropriate care to avoid contact with the body, or inhalation of vapors.

6.6.1 Draining Condensate for Flushing Connection Ring

1) Gradually open the drain screw to drain from the flushing connection ring.(See figure 6.7.)
2) When the flushing connection ring is completely drained, close the drain screw.
3) Tighten the drain screw to a torque of 10 N·m {1 kgf·m}.

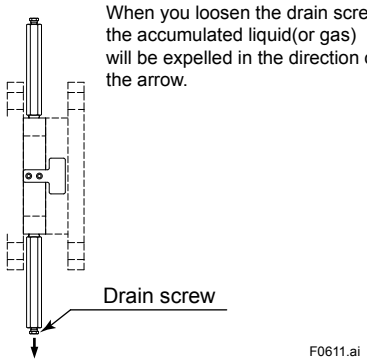

When you loosen the drain screw, the accumulated liquid(or gas) will be expelled in the direction of the arrow.
Drain screw
F0611.ai

Figure 6.7 Draining for Flushing Connection Ring

6.6.2 Venting Gas for Flushing Connection Ring

1) Gradually open the vent screw to vent gas from the flushing connection ring.(See figure 6.8.)
2) When the flushing connection ring is completely vented, close the vent screw.
3) Tighten the vent screw to a torque of 10 N·m

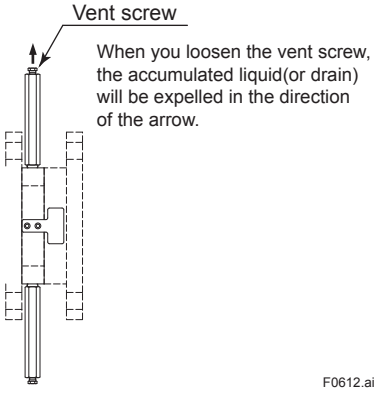

Vent screw
When you loosen the vent screw, the accumulated liquid(or drain) will be expelled in the direction of the arrow.
F0612.ai

Figure 6.8 Venting for Flushing Connection Ring

7. Setting Parameters

This transmitter can remotely handle range changes, Tag No. setup, monitoring of self-diagnostic results, and zero point adjustment, etc. according to communication with the field wireless configuration tool or the device configuration tool.

7.1 Environment for parameter setting

After installing the battery pack, perform provisioning and have the instrument join the field wireless network.
This transmitter supports the OOB (out-of-band) method using the infrared communication as a provisioning method.
Refer to Subsection 6.4 “Connecting to the Field Wireless Network” for details of the provisioning.

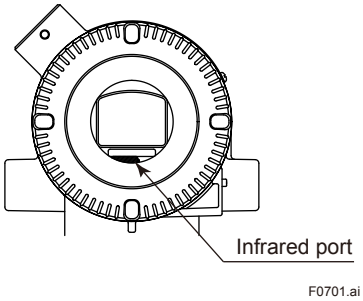


Figure 7.1 Infrared port of the transmitter

7.2 Preparing Software

7.2.1 Softwares for the Field Wireless Configuration Tool and the Device Configuration Tool

Before using the device configuration tool, confirm that CF/DD and DeviceDTM for your transmitter (wireless EJX) are installed in the device configuration tool.
CF/DD and DeviceDTM are provided by DVD-ROM attached to YFGW710 Field Wireless Integrated Gateway.
Refer to YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN) for details.

CF (Capabilities File)/DD (Device Description)

A CF file contains information, such as the vendor of the field device, its model and revision, available types of process data (flow rate, temperature, pressure, etc.), and number of data items. A DD file contains the information on parameters, such as data structures and attributes.

DeviceDTM

DeviceDTM (Device Type Manager), is driver software for field devices provided based on the FDT (Field Device Tool) technology.

The field wireless configuration tool or the device configuration tool allows confirming the device information.
Refer to Subsection 8.2 “Calibration Instruments Selection” for the field wireless configuration tool or the device configuration tool of our recommendation.

7.2.2 Software Download

Software download function permits to update wireless field device software via ISA100.11a wireless communication. For details, refer to YFGW710 Field Wireless Integrated Gateway (IM 01W01F01-01EN) or YFGW410 Field Wireless Management Station (IM 01W02D01-01EN).

7.3 Setting Parameters

7.3.1 Parameter Usage and Selection

Before setting a parameter, please see the following table for a summary of how and when each parameter is used.

IMPORTANT

After setting and sending data with the field wireless configuration tool or the device configuration tool, wait 30 seconds before turning off the transmitter. If it is turned off too soon, the settings will not be stored in the transmitter.

Table 7.1 Parameter Usage and Selection

Item	Description
Tag No.	Sets the tag No. as Device Tag (Software Tag). Sixteen characters (alphanumeric characters, including - and •) can be set.
Output	The process variable and the diagnostic result can be output. Either or all of differential pressure (AI1:Process Value), static pressure (AI2:Process Value), temperature(AI3:Process Value) of capsule or amplifier and self-diagnostic information (UAPMO:Diagnostic Status) can be set to the output
Range	Adjust the range corresponding for 0% to 100%. The unit of the range, input value at 0% (LRV) and input value at 100% (URV) is set. Note: LRV and URV can be set within the range of -32000 to 32000.
Damping time constant	Damping time constant is used to reduce the large fluctuation of pressure signal and given by each Process Value Filter Time parameter for differential Pressure/pressure (AI1) and Static pressure (AI2).
Output signal and integral indicator mode	Sets mode for output signal and integral indicator to “linear mode” (proportional to input differential pressure) or to “Square root mode” (proportional to flow).
Output signal low cut mode	Used mainly to stabilize output near 0 if output signal is the square root mode. Two modes are available: forcing output to 0% for input below a specific value, or changing to proportional output for input below a specific value.
Integral indicator range of scale and unit	Sets one of differential pressure/pressure value, static pressure value, or temperature value for the integral indicator scale. Note: LRV and URV can be set within the range of -32000 to 32000.
Unit for displayed temperature	Sets a temperature unit to be displayed.
Unit for displayed static pressure	Sets a pressure unit for the static pressure to be displayed
Direction of impulse piping connection (which is high pressure, L side or R side)	Used where installation conditions makes it imperative to connect high pressure side impulse line to low pressure side of transmitter. Normally, correspond by replacing impulse line, and use this function only when unavoidable.
Range with actual input applied	Range corresponding for 0% to 100% signal is set with actual input applied. The output setting can be done just 100% to user’s reference pressure output. However, when shipping it, the calibration is done in high accuracy as for DPharp. Please do the span setting by a usual range setting.
Zero Point Adjustment and Span Adjustment	Handle Zero Point Adjustment and Span Adjustment. There are two methods of Zero Point Adjustment, using external zero-adjustment screw and using the device configuration tool.
Reset adjustment	The amount of the adjustment set by user can be cleared.
Software write protect	Prohibit writing the setting data.
Operational mode	Set the operational mode of the sensor and integral indicator, etc.

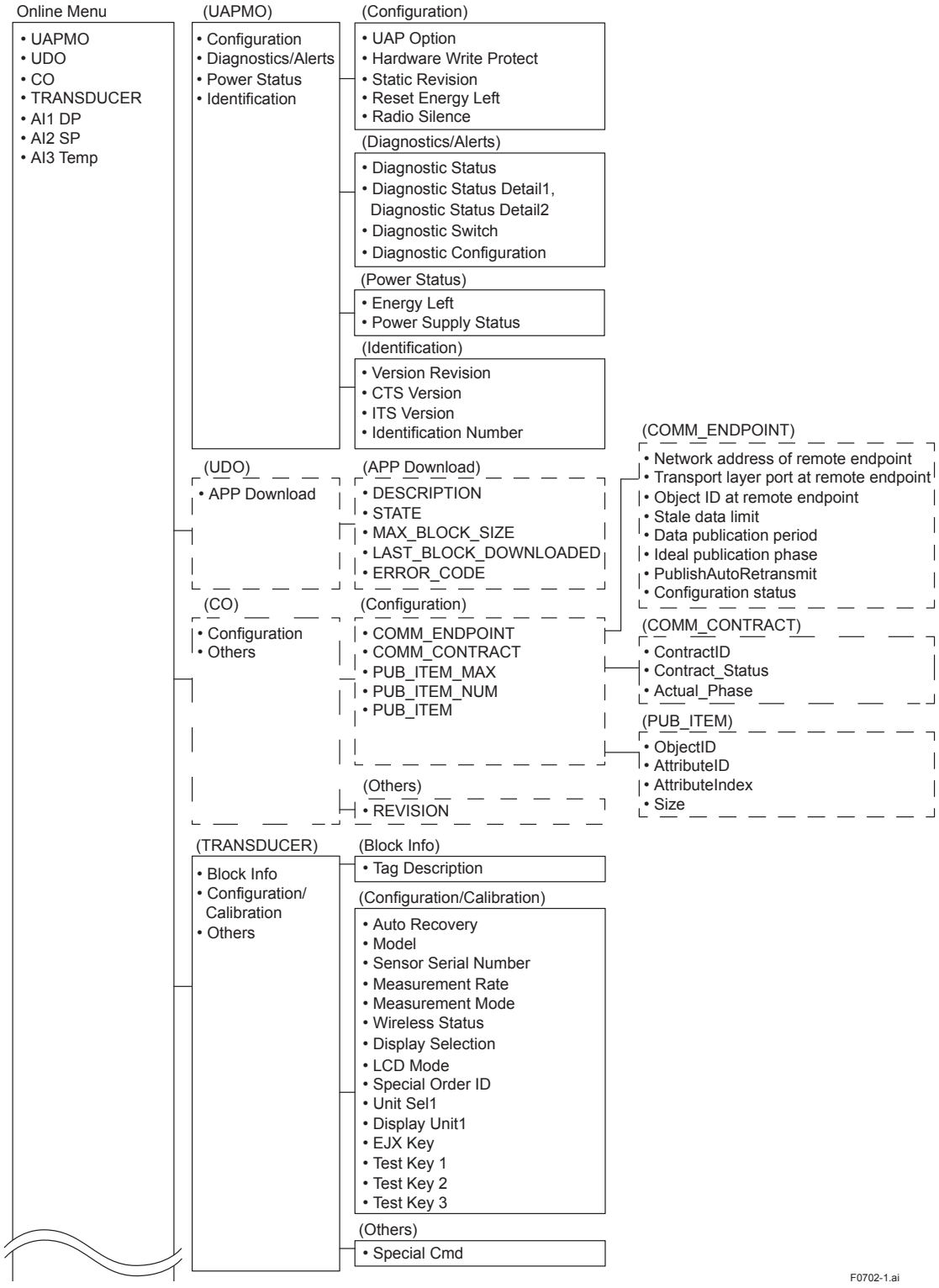
Note: Some of the parameter settings are in the dialogue form called method, the on-line instructions you can configure the parameters easily.

7.3.2 Function Block and Menu Tree

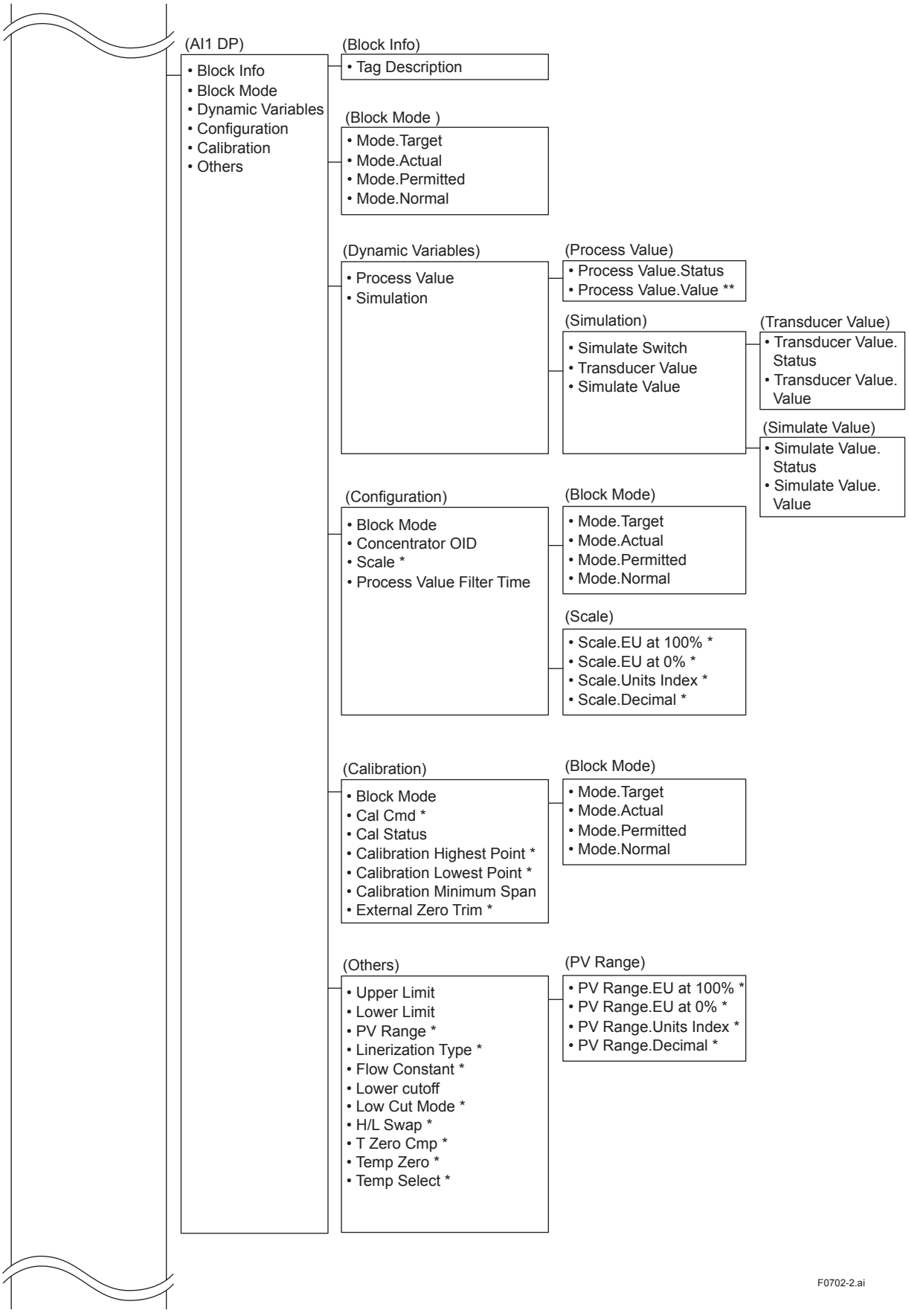
(1) Function Block

The function of this transmitter is shown below. A specific function might not be able to be used according to the field wireless configuration tool used. When the field wireless configuration tool of our recommendation is used, the software attached to the Field Wireless Integrated Gateway is necessary for setting the dotted line part. Refer to Subsection 8.2 “Calibration Instruments Selection” for the field wireless configuration tool of our recommendation.

(a) Integral antenna type (Amplifier housing code: 7)



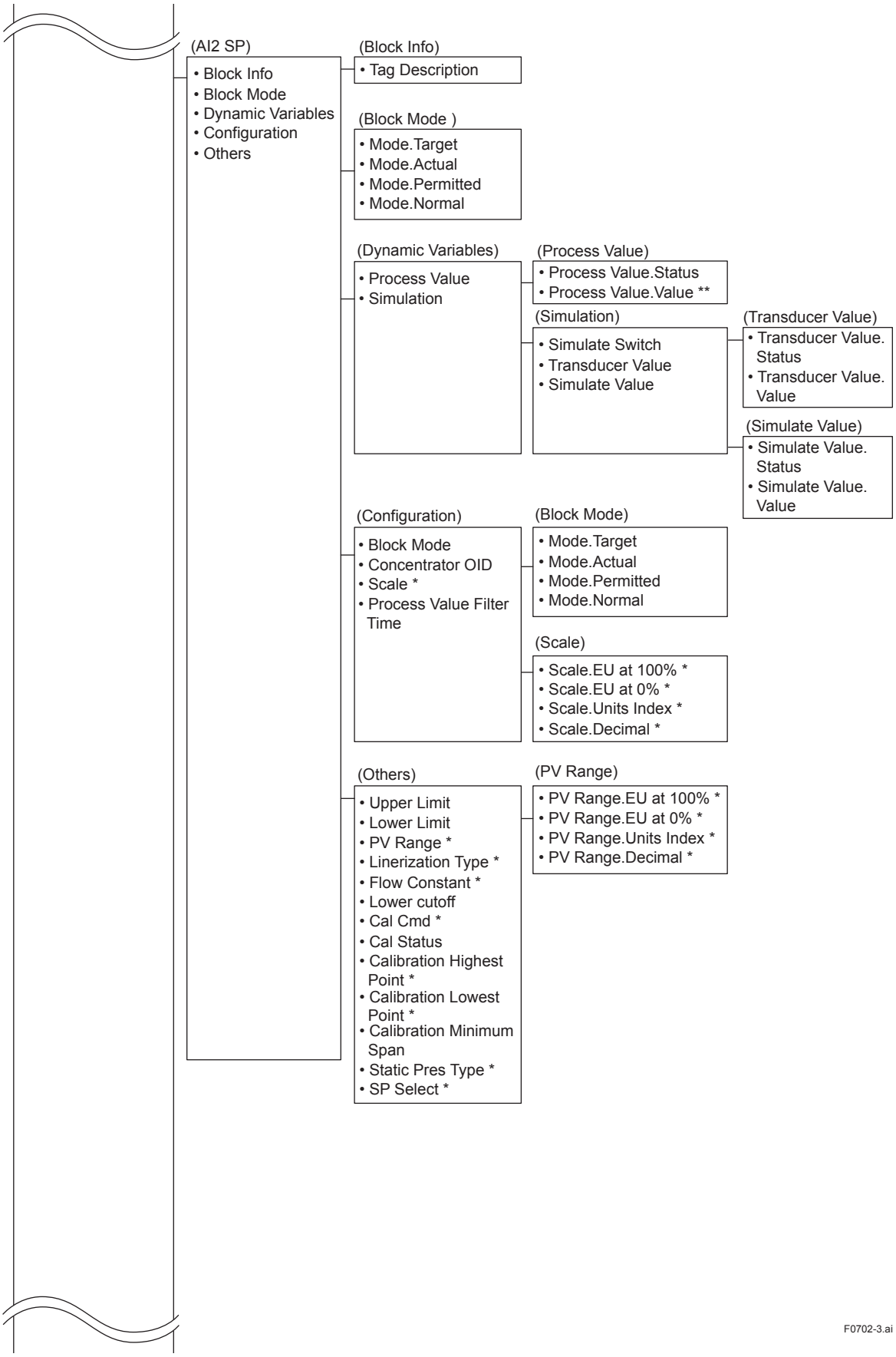
Online Menu (continued)



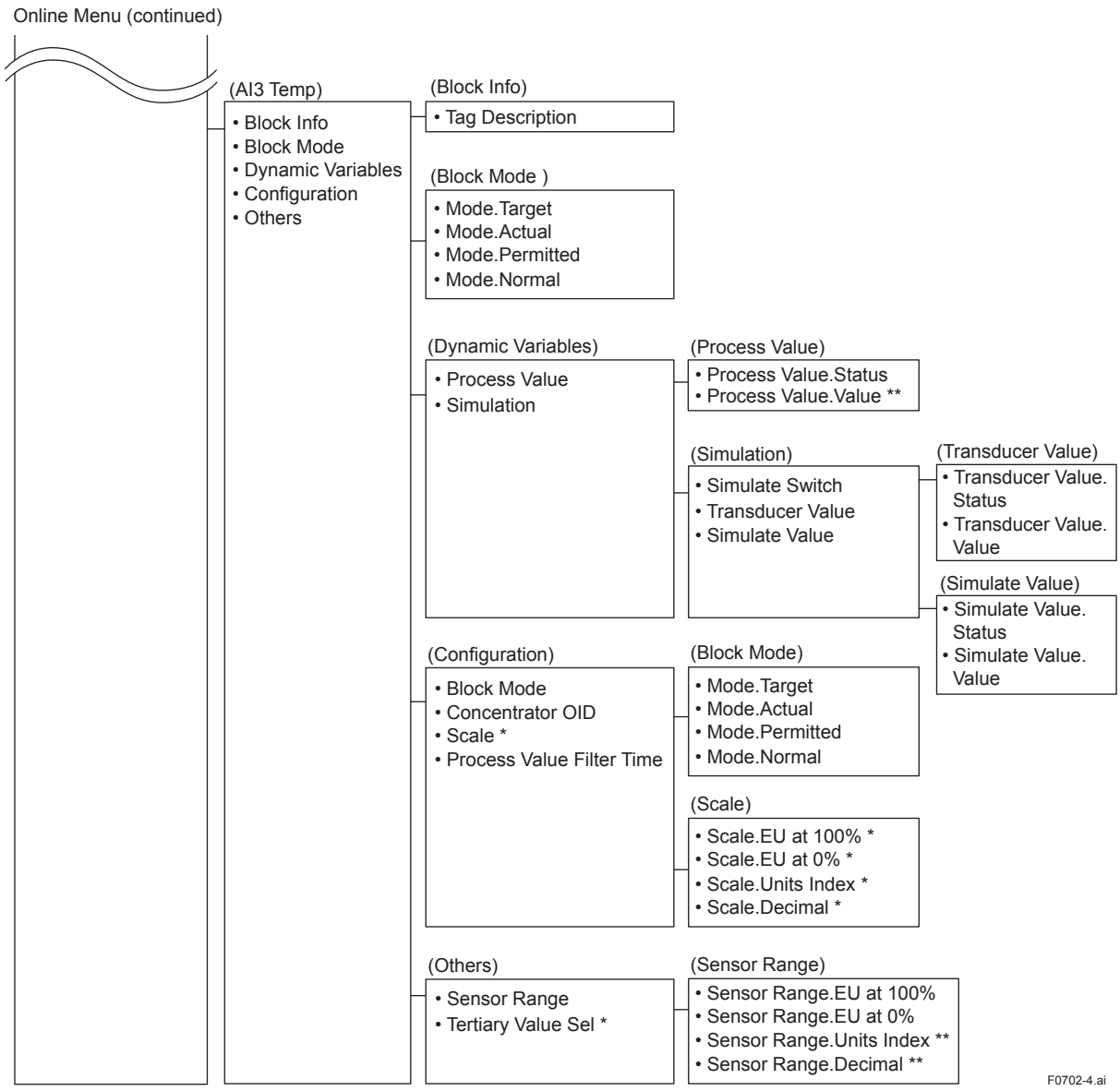
F0702-2.ai

*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

Online Menu (continued)

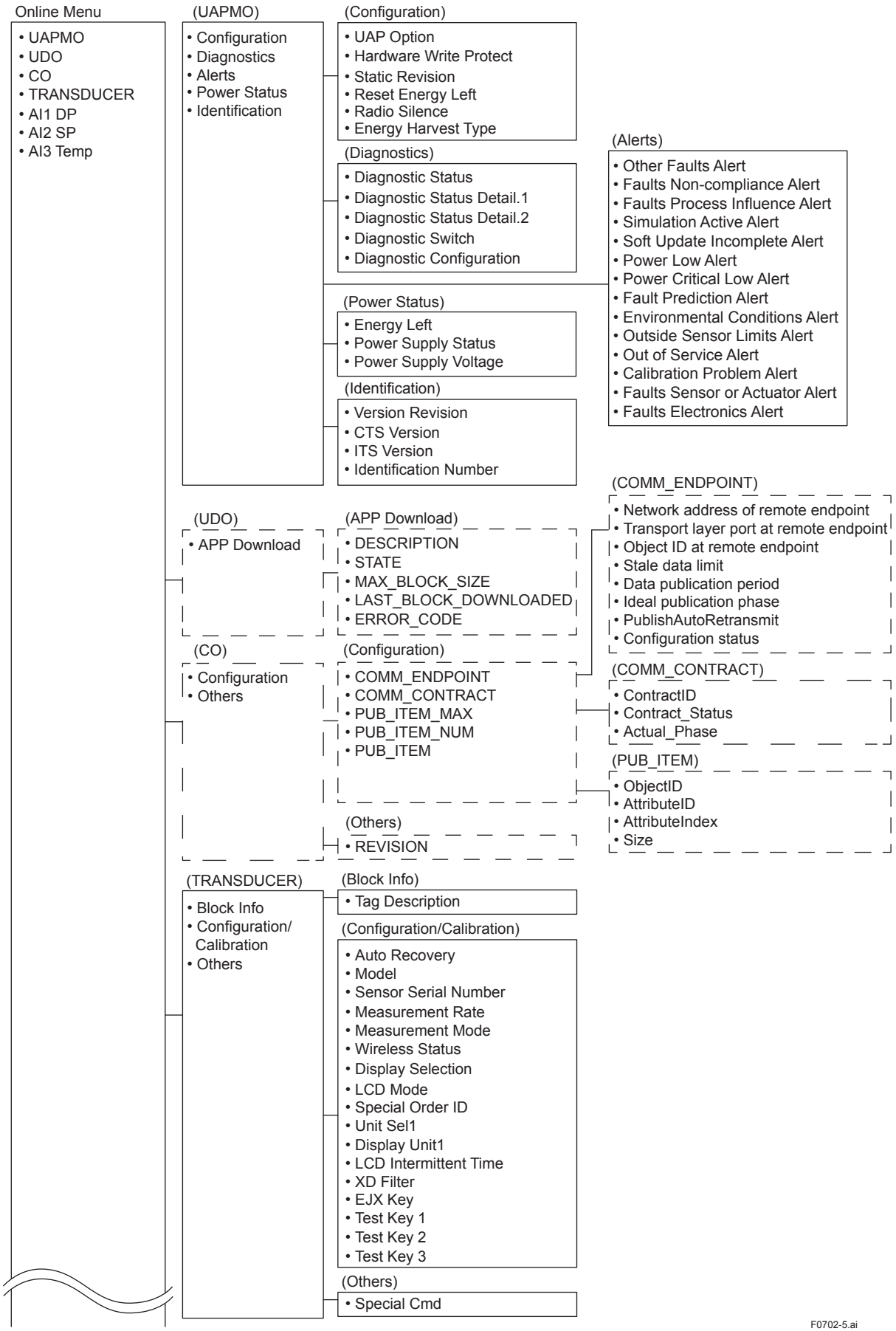


*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

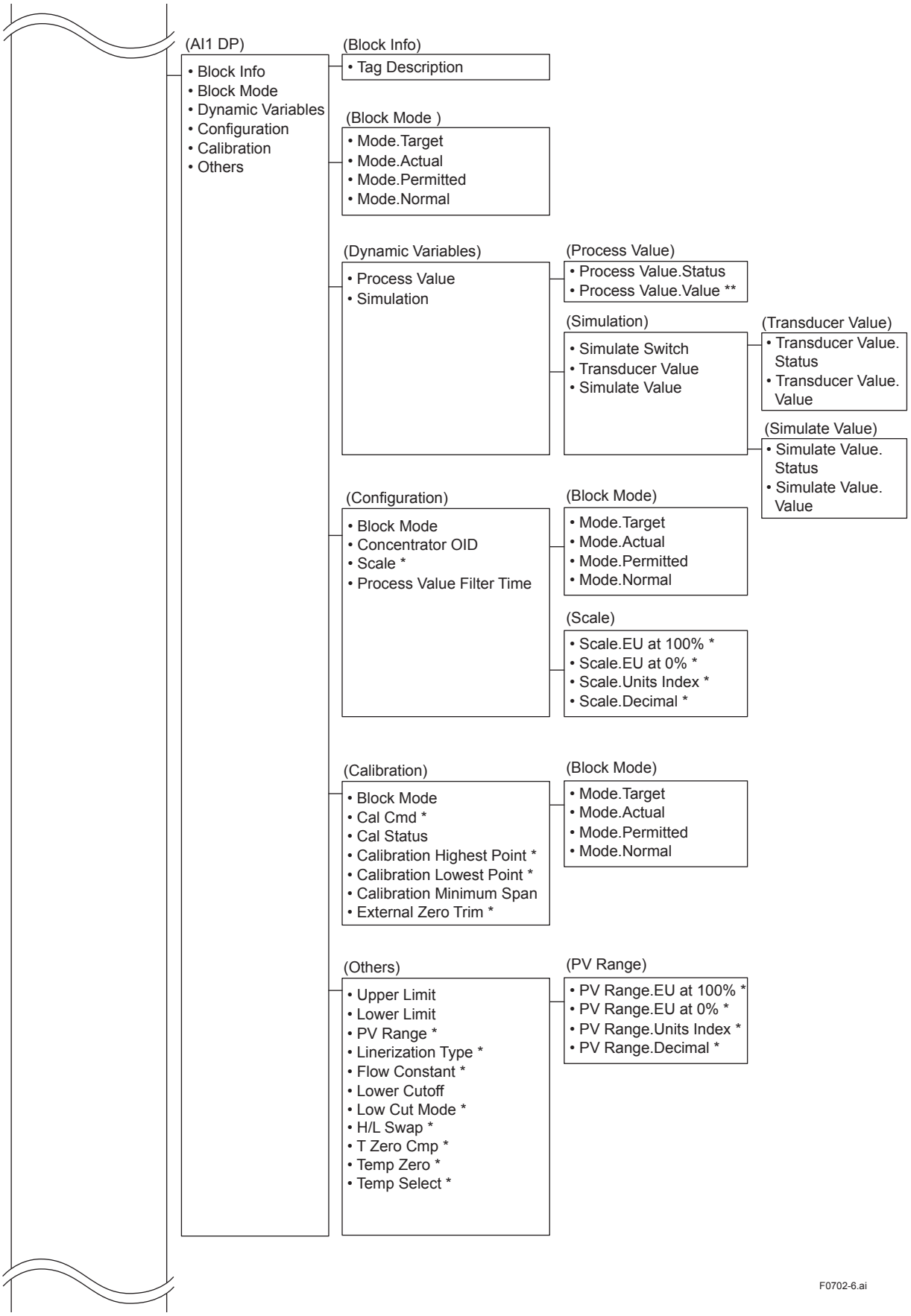


*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

(b) Detachable antenna type (Amplifier housing code: 8 or 9)

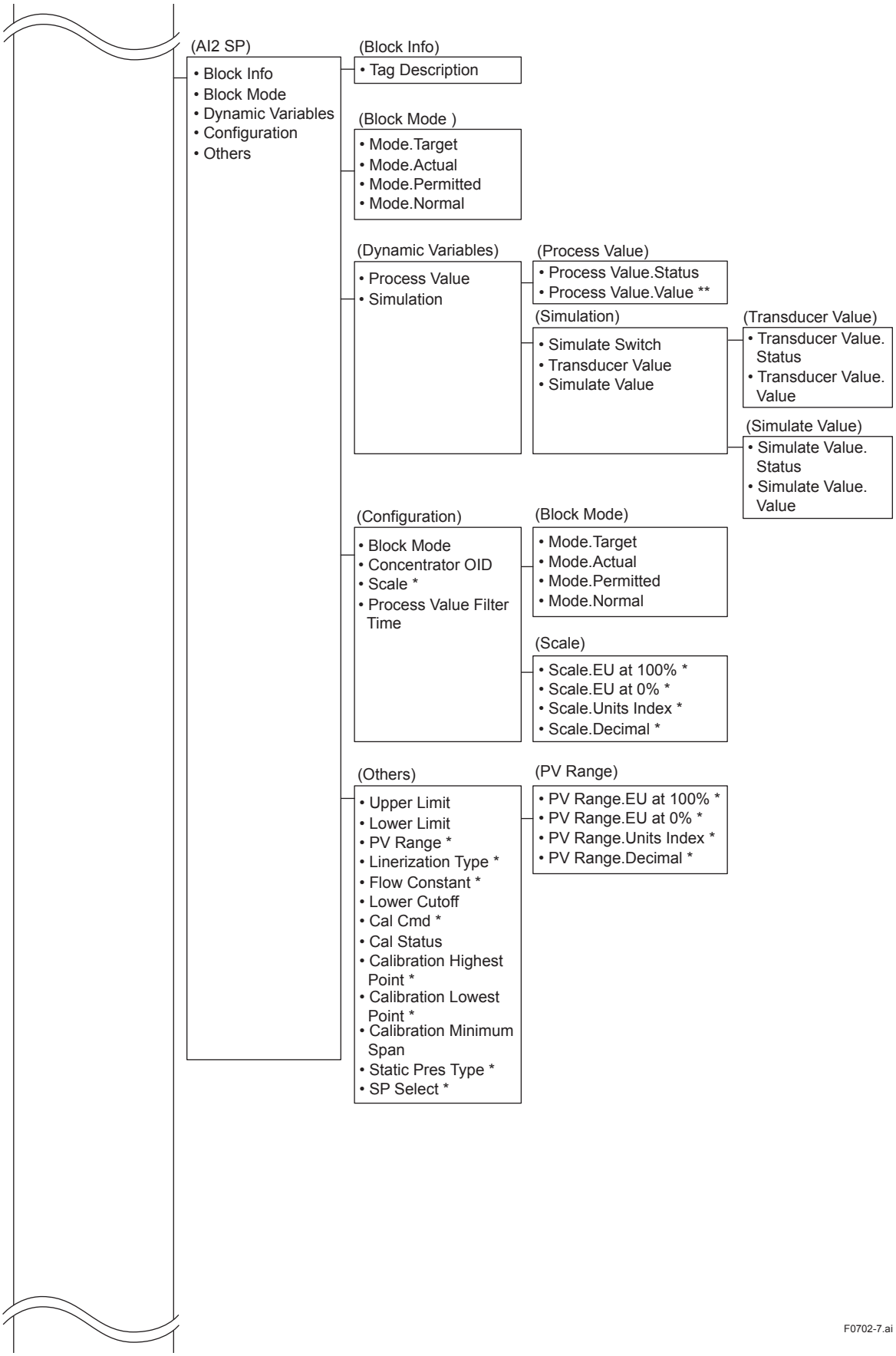


Online Menu (continued)



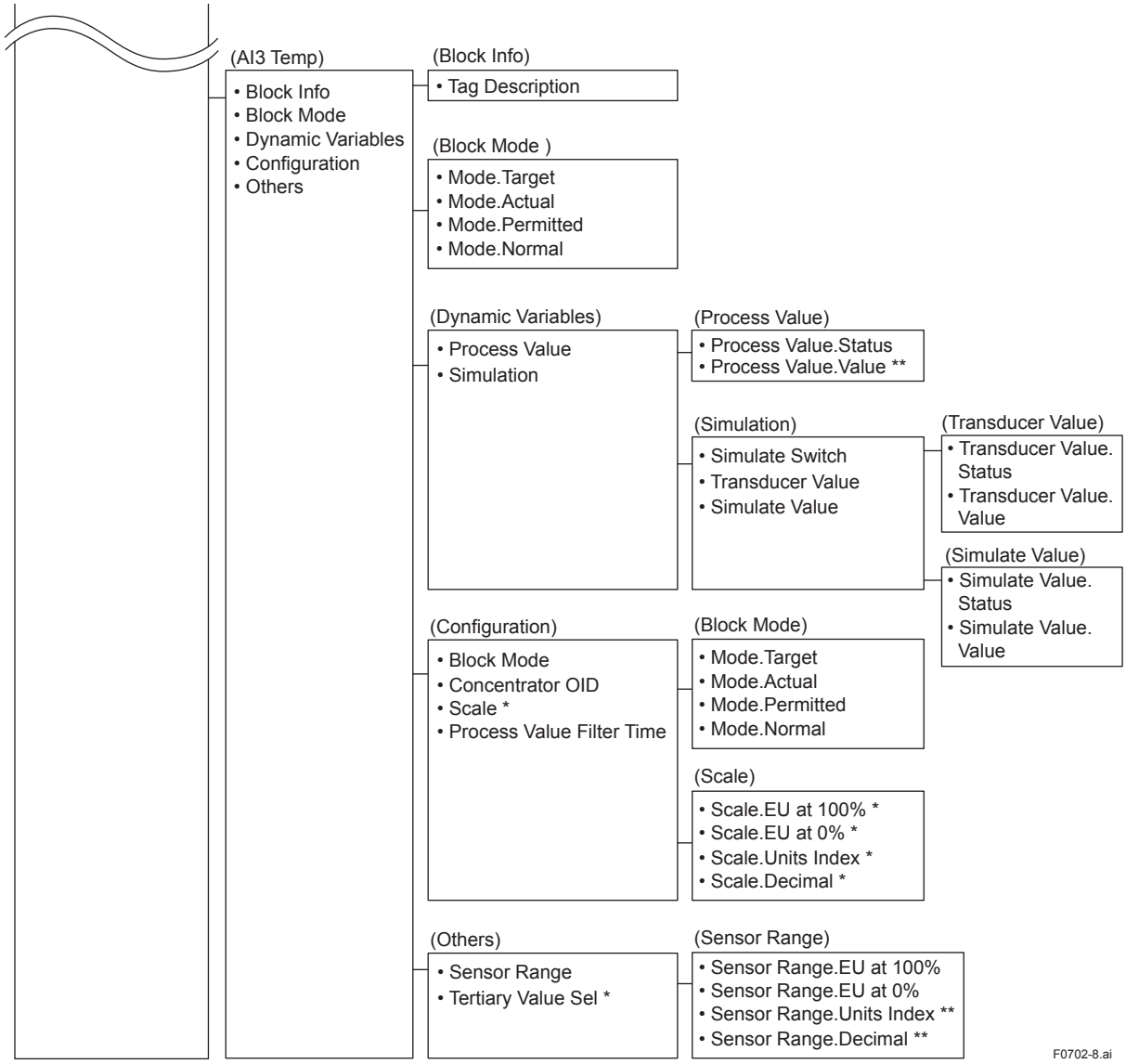
*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

Online Menu (continued)



*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

Online Menu (continued)

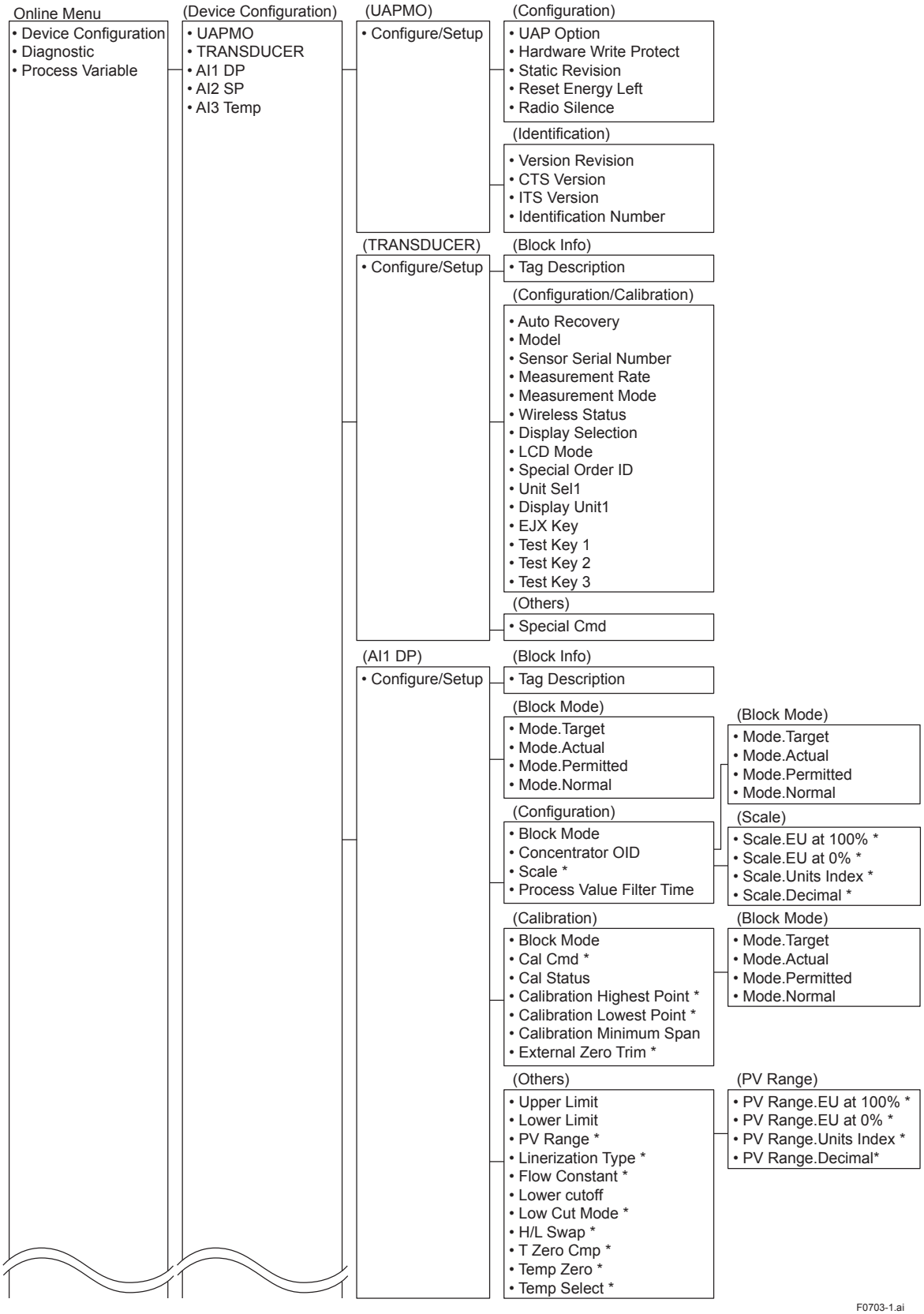


*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).
**: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to Manual.

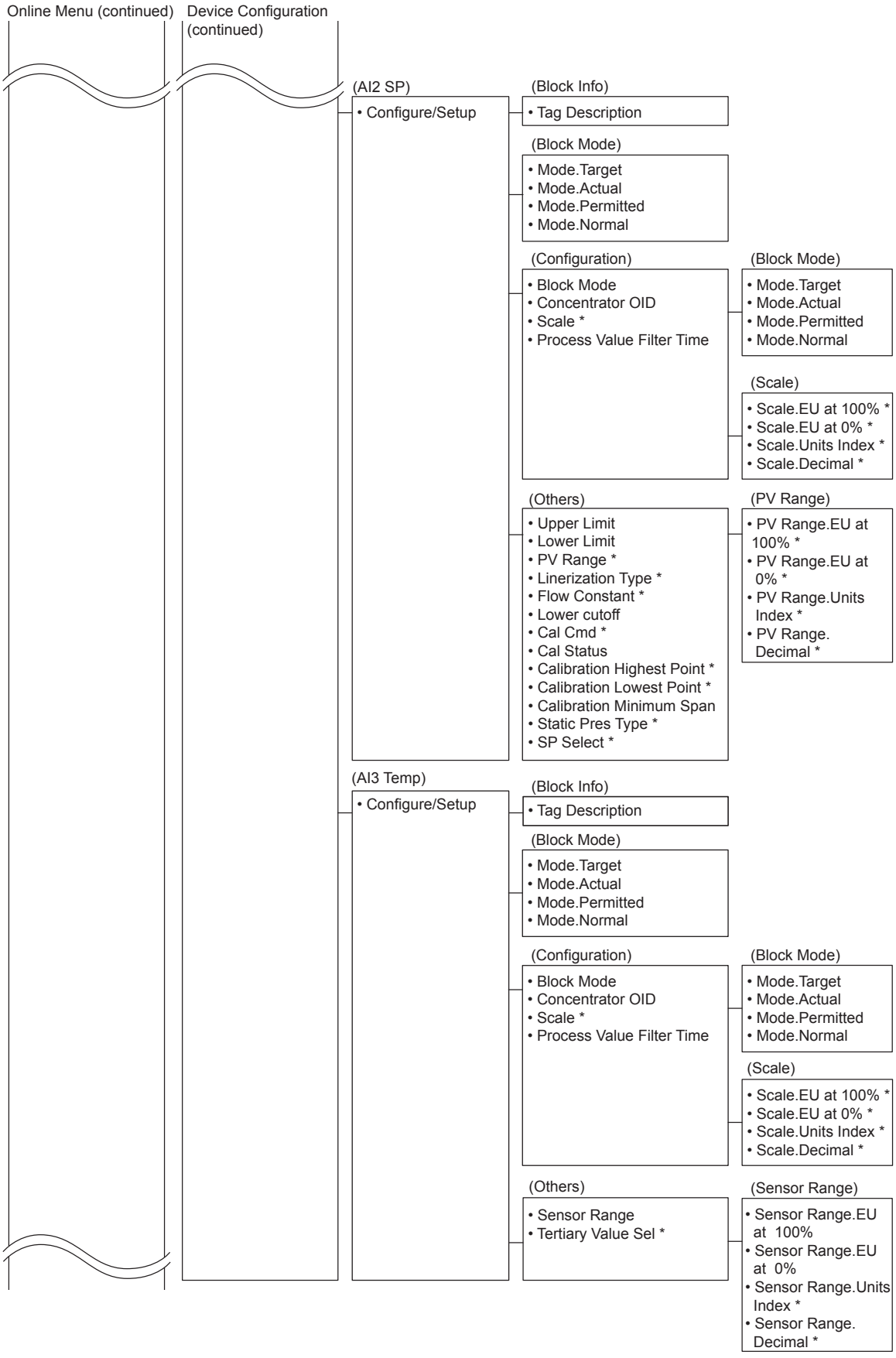
(2) Menu Tree

The menu tree of the device configuration tool of our recommendation is shown below. Refer to Subsection 8.2 “Calibration Instruments Selection” for the device configuration tool of our recommendation.

(a) Integral antenna type (Amplifier housing code: 7)

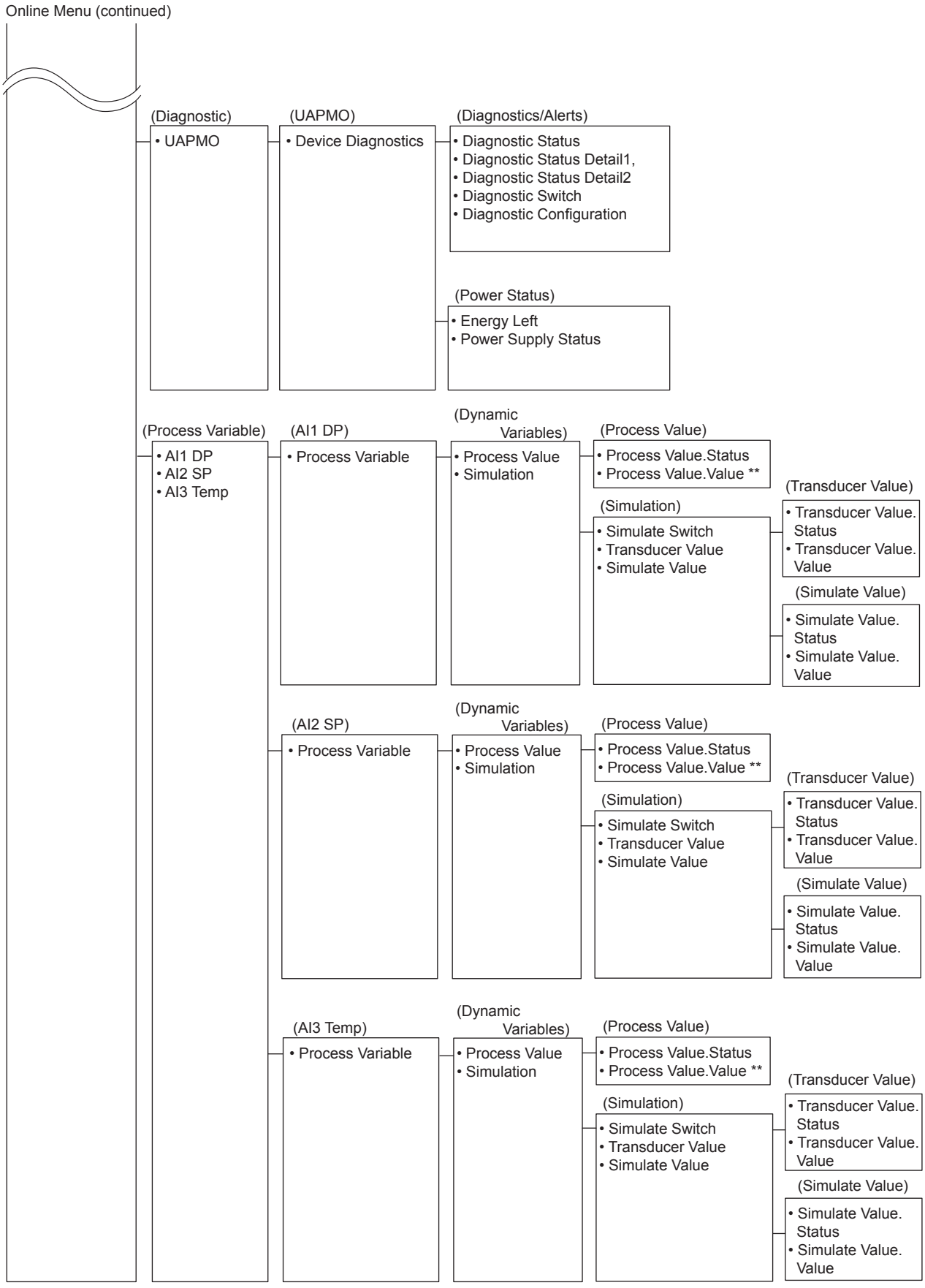


*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).



F0703-2.ai

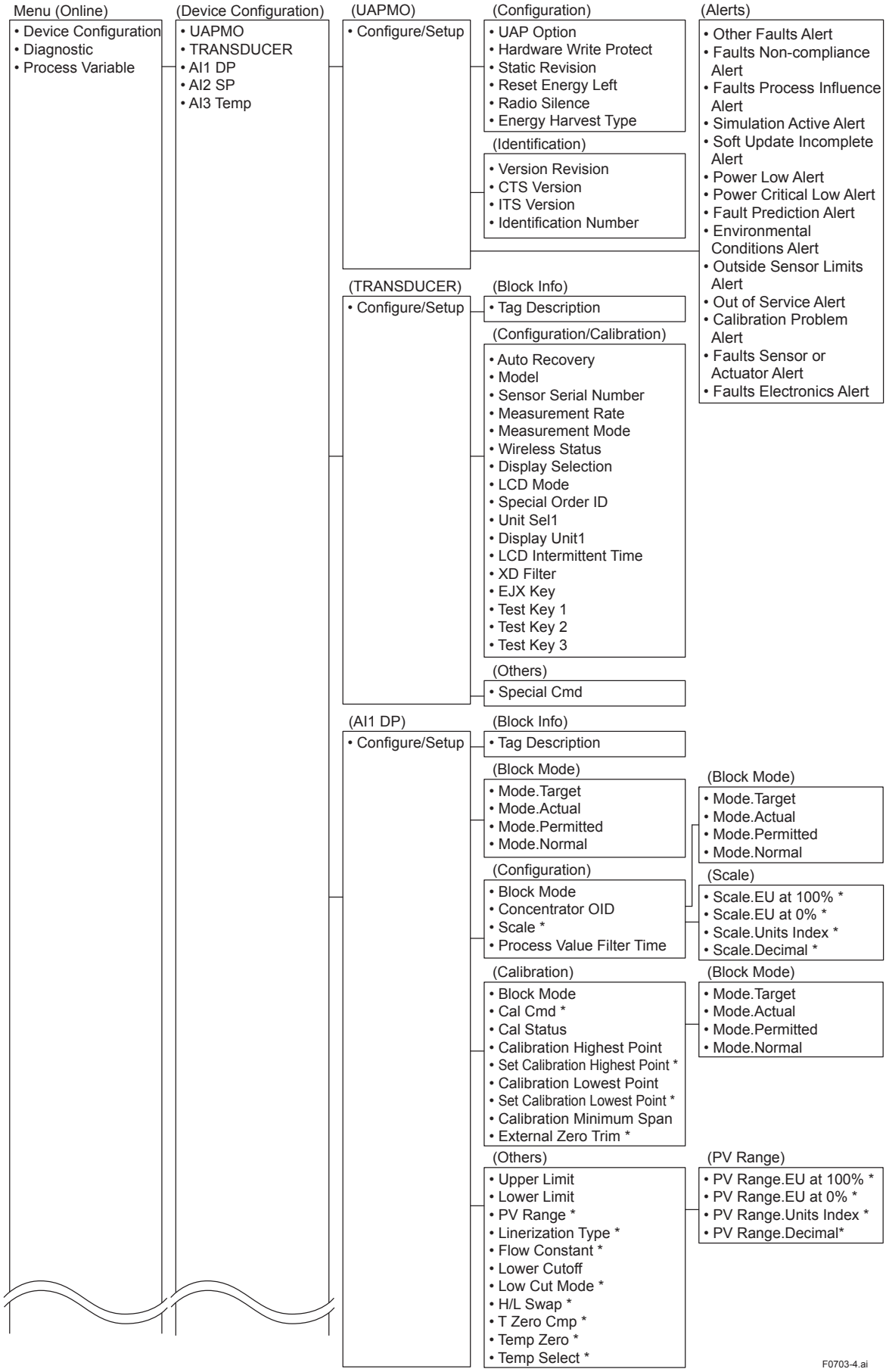
*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).



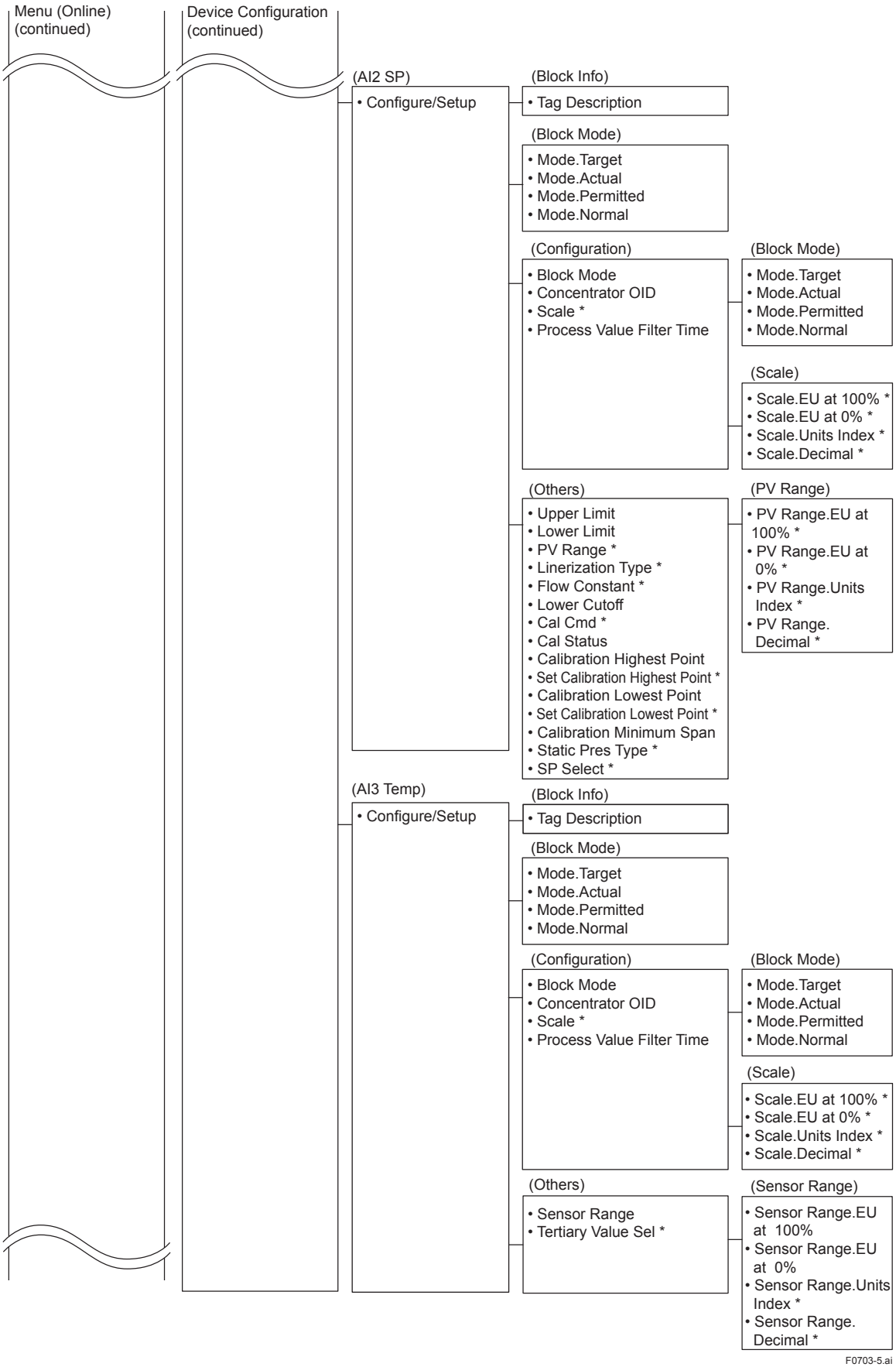
F0703-3.ai

*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).

(b) Detachable antenna type (Amplifier housing code: 8 or 9)

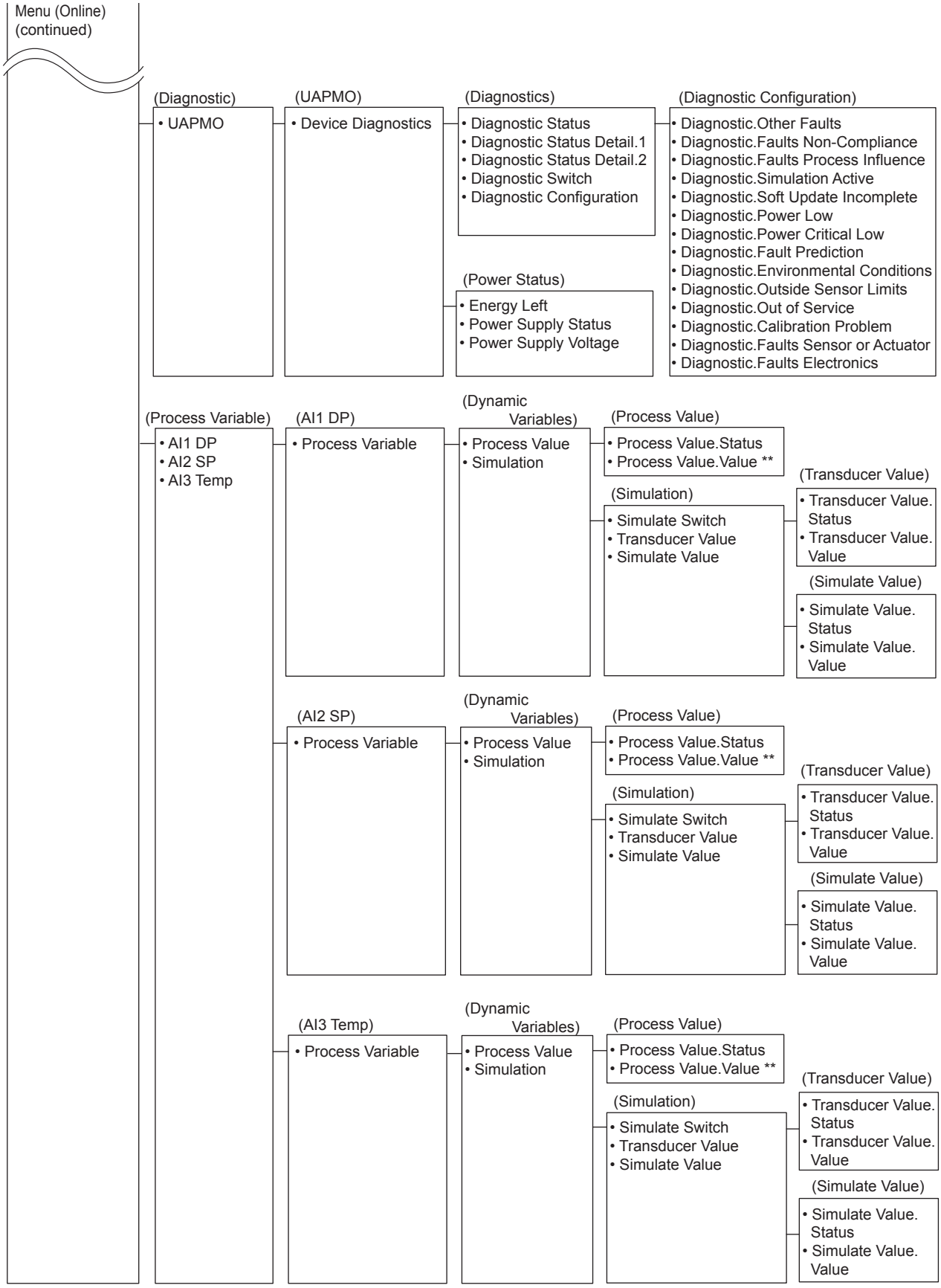


*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).



F0703-5.ai

*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).



F0703-6.ai

*: When the data of these parameters is rewritten, it is necessary to set the operational mode of the block to O/S (Out of Service).

7.3.3 Parameters for Wireless Communication

(1) Network Information

Concentrator object block : Configuration

Allows confirming the network information.

(2) Update Time

CO block : Data publication period

Sets the update time value to 0.5 to 3,600 seconds. When amplifier housing code 7 is specified, note that more than one second is available.
When update time is set 0 seconds, the transmitter is stopped to update process variables by way of the field wireless network. And the transmitter continues to measure process variables with special interval time internally.

(3) Measurement Mode

TRANSDUCER block : Measurement Mode

The setting affects the battery life; it becomes shorter in the continuous mode.
When the update period is set to 1 second or less in intermittent mode, the mode is automatically switched to continuous mode. When the update period is 1 second, the mode is continuous mode, regardless of the measurement mode.

(4) Measurement Rate

TRANSDUCER block: Measurement Rate

Reads the measurement rate value from 0.5 to 3600 seconds. When amplifier housing code 7 is specified, note that the period more than one second is displayed. The shorter the measurement period, the shorter the battery life.

(5) Remaining battery life

UAPMO block: Energy Left

The number of days of remaining battery life is indicated assuming that a transmitter has been working under ambient temperature condition as 23 degrees Celsius. It takes several days for the indicated value to be stabiilzed after the power on and initialization of the remaining battery life.

UAPMO block: Reset Energy Left

When changing batteries, the remaining battery life is initialized by Reset Energy Left parameter.

(6) LCD display

The following steps describe how to set LCD display.

- **Integral antenna type (Amplifier housing code: 7)**

1. On/Off of display
   When “LCD Intermittent” in LCD Mode is parameter is selected, the LCD first displays a set of screens to be shown and then turns off for a minute, and the display keeps the cycle repeatedly. Not selecting this parameter turns the LCD off.
2. On/Off of continuous display mode
   When “LCD Continue” in LCD Mode is selected, the LCD displays for 5 minutes continuously then transits to the setting in the LCD Intermittent.
   When measurement mode is set as continuous mode, the LCD displays continuously regardless of display mode.
   When the update time is set to 1 second, the LCD display stays on regardless of the status in LCD Mode.
3. On/Off of bar graph
   Select “LCD Bargraph ON” in LCD Mode when the bar graph is required.

- **Detachable antenna type (Amplifier housing code: 8 or 9)**

1. On/Off of display
   When “Enable” in LCD Mode is selected, the LCD displays a set of screens to be shown and turns off for the specified time based on LCD Intermittent Time, and the display keeps the cycle repeatedly. Not selecting this parameter turns the LCD off.
2. On/Off of continuous display mode
   When “Enable” is set to LCD Mode and zero is set to LCD Intermittent Time, the LCD displays continuously.
3. On/Off of bar graph
   Select “LCD Bargraph ON” in LCD Mode when the bar graph is required.

When the wireless connection process is in the status of “ready,” “pause,” or “join,” the LCD display stays on regardless of the status in LCD Mode.

NOTE

When the device detects AL01 and AL02, the LCD display stays on regardless of the status in LCD mode. See Table 8.3 and 8.4 Error Message Summary for details.

7.3.4 Tag and Device Information

If these are specified when ordering, the designated Tag No. and device information are set and shipped. Tag No. and device information can be checked as follows.

- Procedure to call up the tag No. and device information
  - Device Tag (Software Tag)
    This is specified when writing characters (up to 16 characters) of amplifiers TAG that differ from characters specified in Tag No.
    Refer to section 7.4 “Connection to the Field Wireless Network” for confirmation.
  - Tag Description
    This is a universal parameter to store the comment that describes the content of the tag located in the TRANSDUCER and AI blocks.
    The AI1, AI2, and AI3 blocks of the AI blocks correspond to the differential pressure, static pressure, and temperature, respectively.
- When changing the device information, input the information based on the following limitation on the number of characters.
  - Message function (up to 32 characters)
    TRANSDUCER block : Tag Description
    AI1-AI3 block : Tag Description

7.3.5 Unit

The unit parameter is set at the factory before shipment if specified at the time of order. Follow the procedure below to change the unit parameter.

- Procedure to call up the Unit display (Units Index)
  AI1 - AI3 block : Scale. Units Index

  To change the Unit display, choose desired unit among the list of displayed unit selecting AI1 block as for the differential pressure, AI2 as for the static pressure and AI3 block as for temperature in the AI blocks.

7.3.6 Range Change

The range values are factory-set as specified by the customer. To change the range, follow the steps below.
The measurement span is determined by the upper and lower range values. In this method, the upper and lower range values can be set independently, and the span changes according to the range limit values sent to the transmitter.

- Procedure to call up the PV Range display.
  AI1, AI2 block : PV Range

  Select the AI1 block for the differential pressure and the AI2 block for the static pressure, then select “EU at 0%” and “EU at 100%” displayed in the PV Range parameters, and input the lower range and upper range values for the range, respectively.

7.3.7 Output Mode

The output mode of the output signal can be set as No Linearization or Sq root.

- Procedure to call up the Linearization Type display
  AI1, AI2 block : Linearization Type

  Select the AI1 block for the differential pressure and the AI2 block for the static pressure, and then select No Linearization or Sq root for the Linearization Type parameter.

7.3.8 Output Signal Low Cut Mode Setup

Low cut mode can be used to stabilize the output signal near the zero point.
(There is 10% of hysteresis at only point of transition from low to high.)

[Setup Low Cut Value]

- Procedure to call up the Lower cutoff* display
  AI1 block: Lower cutoff*

Example: setup LOW_CUT of output to 15%

Lower cutoff*
= (“Eu at 100%” - “Eu at 0%”) × 0.15 + “Eu at 0%”

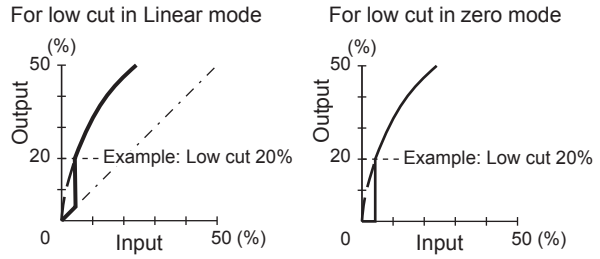
*: “Low Cutoff” is used instead of “Lower cutoff” for Detachable antenna type (Amplifier housing code: 8 or 9).

[Setup Low Cut Mode]

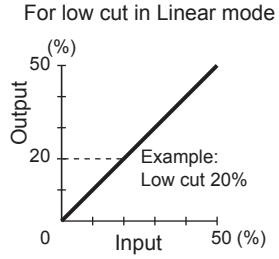
- Procedure to call up the Low Cut Mode display
  AI1 block: Low Cut Mode

Example:Low cut at 20%

[sq root output]



[Linear output]

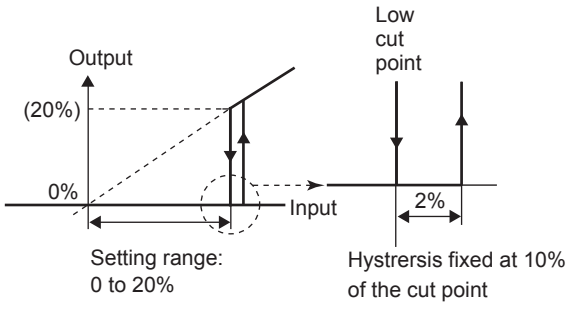


F0704.ai

Figure 7.3 Low Cut Mode

The low cut point has hysterisis so that the output around the point is behaved as below figure.

<Example>
Output mode: Linear
Low cut mode: Zero
Low cut: 20.00%



F0705.ai

7.3.9 Impulse Line Connection Orientation Setup

This function reverses the impulse line orientation.

Follow the procedure below to assign the high pressure impulse line connection to the L side of the transmitter.

- Procedure to call up the H/L Swap display
  TRANSDUCER block : H/L Swap

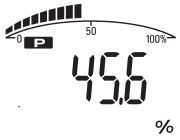
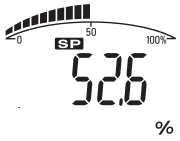
  Select Reverse among two choices (Normal / Reverse) in a H/L Swap parameter.
  Normal is chosen at the time of shipment.

7.3.10 Integral Indicator Display Mode

It is easy to check on the LCD whether Non Linearization or Sq root is set in the Linearization Type parameter selected in the output mode for the output signal.
When Linear is set in the Linearization Type parameter, “√” is displayed on the integral indicator.

7.3.11 Integral Indicator Scale Setup

The following three displays are available for the integral indictor: differential pressure, static pressure, and temperature. The following three variables can be displayed on the integral indicator: % of differential pressure range, % of static pressure range, and % of temperature range.

Available displays	Description and related parameters
% of range (PRES %) 	Indicates input pressure in –10 to 110% range depending on the set range (**LRV** and **URV**). PRES % 45.6 %
% of static pressure range (SP %) *1 	Indicates input static pressure in –10 to 110% range depending on the set range (**SP LRV** and **SP URV**). SP % 52.6 %

*1: Available for differential pressure transmitter.

Follow the procedure described in (1) to (2) below to set the integral indicator.

(1) Display Selection

Display set to Display Selection is displayed on the integral indicator.

- Procedure to call up the Display Selection display
  TRANSDUCER block : Display Selection

  The Display Selection parameter enables the differential pressure (AI1 block), static pressure (AI2 block), and temperature (AI3 block) to be displayed on the LCD. Select whether or not to enable each block to be displayed

(2) Cyclic Display

Information in the AI1 to AI3 blocks can be displayed cyclically according to the display On/Off setting for the differential pressure (AI1 block), static pressure (AI2 block), and temperature (AI3 block) selected in the Display Selection parameter.

7.3.12 Unit for Displayed Temperature

When the instrument is shipped, the temperature units are set to **C** (Centigrade). Follow the procedure below to change this setting.

- Procedure to call up the Sensor Range.Units Index display
  AI3 block : Sensor Range.Units Index

  Confirm that °C(deg C) is selected in the Sensor Range.Units Index parameter for the temperature (AI3 block).

Note: When the unit is changed by Sensor Range.Units Index parameter in temperature (AI3 block) , units of capsule temperature is also changed.

7.3.13 Unit for Displayed Static Pressure

Follow the procedure to change the static pressure unit.
Changing this parameter also changes the unit for the static pressure display.

- Procedure to call up the PV Range.Units Index display
  AI2 block : PV Range.Units Index

  Confirm that KPa is selected in the PV Range. Units Index parameter for the static pressure (AI2 block).

Monitoring the high or low static pressure of the capsule depends on the setting of parameter ‘SP Select.’

- Procedure to call up the SP Select display
  AI2 block : SP Select

  Select High or Low in the SP Select parameter for the static pressure (AI2 block).

Type of static pressure is set Absolute pressure (Abs) at shipment.

When changing monitoring type of static pressure, Follow below procedure.

- Procedure to call up the Static Press Type display
  AI2 block : Static Press Type

  Select gauge pressure (Gauge) or absolute pressure (Abs) in the Static Press Type parameter for the static pressure (AI2 block).

7.3.14 Zero Point Adjustment and Span Adjustment

Each EJX-B Series Differential Pressure/Pressure Transmitter is characterized by factory. But there are some errors caused by environment and installed posture.

There are Zero and Span Adjustments to fine-tune those errors.
Zero Adjustment is adjustment for one point to adjust the bottom value of the measurement range as 0 % of output.

The Span Adjustment defines input and output characteristic between two points that's one side assumed as standard.
This is used when there is doubt of span drift or when it is impossible to make zero at absolute pressure with adjustment for user's pressure standard.

(1) Zero Point Adjustment

a. To set 0% at current input, perform following procedure.

This method is used only when the pressure at bottom of measurement range is zero.

- Procedure to call up the lower limit adjustment parameter (Calibration Lowest Point).
  AI1 block : Calibration Lowest Point

  Set 0 to Calibration Lowest Point parameter for differential pressure (AI1 block).

- Procedure to call up the calibration adjustment parameter (Cal Cmd).
  AI1 block : Cal Cmd : CAL_LOW

  Lower limit is changed by using Cal Cmd parameter for differential pressure (AI1 block).

- Procedure to call up the calibration status parameter (Cal Status).
  AI1 block : Cal Status

  Confirm the calibration status of CAL_ SUCCESS(1) using the Cal Status parameter.

b. To match current input and output value, follow procedure

Like tank level measurement that is impossible to set actual level to zero, output value is adjustment to actual level by other measurement using glassgage.

Example:
Differential Pressure and Pressure Transmitter's span is 0 to 25.00kPa, current level is 13.50kPa, current output is 13.83kPa.

- Procedure to call up the lower limit adjustment parameter (Calibration Lowest Point).
  AI1 block : Calibration Lowest Point

  Set the actual level value of 13.50 kPa to the Calibration Lowest Point parameter for the differential pressure (AI1 block). Apply an actual input and confirm the value specified in Calibration Lowest Point as the output value.

- Procedure to call up the calibration adjustment parameter (Cal Cmd).
  AI1 block : Cal Cmd : CAL_LOW

  The present output is changed from 13.83 kPa to 13.50 kPa in CAL_LOW of the differential pressure (AI1 block) Cal Cmd parameter.

- Procedure to call up the calibration status parameter (Cal Status).
  AI1 block : Cal Status

  Confirm the value of CAL_SUCCESS (1) using the Cal Status parameter.

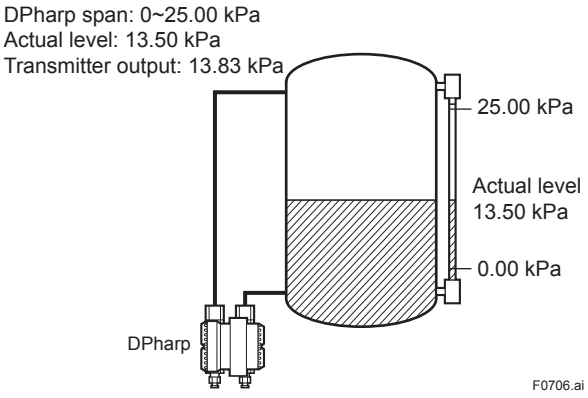


Figure 7.4 Tank level measurement

c. Using External Zero-adjustment Screw

External Zero-adjustment parameter (External Zero Trim) can set permission or prohibition to adjustment by External Zero-adjustment Screw.

Set “Trim on” to use the External Zero-adjustment Screw. (“Trim on” at shipment)

Use a slotted screwdriver to turn the zero-adjustment screw. Equalize the transmitter, then turn the screw clockwise to increase the output or counterclockwise to decrease the output. The zero point adjustment can be made with a resolution of 0.01% of the setting range. The degree of zero adjustments varies with the screw turning speed; turn the screw slowly to make a fine adjustment, quickly to make a rough adjustment.

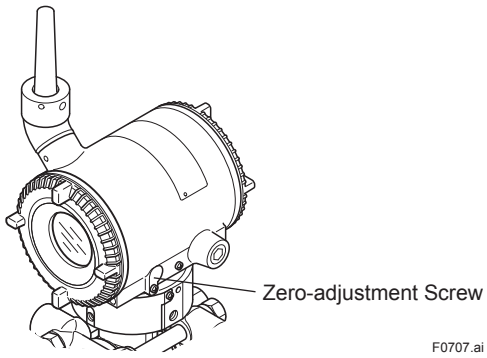


Figure 7.5 Zero-adjustment Screw

(2) Span Adjustment

Span Adjustment is function to change the input and output characteristic that assumed the bottom value (zero point) of measurement range a standard. Therefore, perform span adjustment (adjustment of the upper limit value) after zero adjustment (adjustment of bottom limit value).

After adding the pressure at point of adjustment and setting pressure value as parameter, the transmitter calculates quantity of adjustment and performs adjustment automatically.

- Procedure to call up the lower limit value parameter (Calibration Lowest Point).
  AI1 block : Calibration Lowest Point

  Set the lower limit adjustment value on the differential pressure (AI1 block) Calibration Lowest Point parameter screen. Apply a reference pressure corresponding to the lower limit of the measurement range to the differential pressure/pressure transmitter and confirm the reference pressure when it has stabilized.

- Procedure to call up the calibration adjustment parameter (Cal Cmd).
  AI1 block : Cal Cmd : CAL_LOW

  Confirm the lower limit of the measurement range in CAL_LOW of the differential pressure (AI1 block) Cal Cmd parameter.

- Procedure to call up the calibration status parameter (Cal Status).
  AI1 block : Cal Status

  Confirm the value of CAL_SUCCESS (1) using the Cal Status parameter.

- Procedure to call up the upper limit adjustment parameter (Calibration Highest Point).
  AI1 block : Calibration Highest Point

  Set the upper limit adjustment value for the differential pressure (AI1 block) Calibration Highest Point parameter. Apply a reference pressure corresponding to the upper limit of the measurement range to the differential pressure/ pressure transmitter and confirm the reference pressure when it has stabilized.

- Procedure to call up the calibration adjustment parameter (Cal Cmd).
  AI1 block : Cal Cmd : CAL_HIGH

  Confirm the upper limit of the measurement range in CAL_HIGH of the differential pressure (AI1 block) Cal Cmd parameter.

- Procedure to call up the calibration status parameter (Cal Status).
  AI1 block : Cal Status

  Confirm the value of CAL_SUCCESS (1) using the Cal Status parameter.

(3) Adjustments for Static Pressure

For the EJX differential transmitters, zero point and span adjustments of static pressure is performed in the same way as with the primary process variable (PV).
Adjustment should be performed using the static pressure (AI2 block) Cal Cmd parameter. After calibration, confirm the status by using the static pressure (AI2 block) Cal Status.

- Procedure to call up the calibration adjustment parameter (Cal Cmd).
  AI2 block : Cal Cmd

Perform differential pressure zero/span adjustment before static pressure zero/span adjustment.

(4) Reset Adjustment

Reset Adjustment clear the amount of adjustment. Reset Ajustment can be performed using CAL_ CLEAR of the differential pressure (AI1 block) Cal Cmd parameter for the input pressure and using CAL_CLEAR of the static pressure (AI2 block) Cal Cmd parameter for the static pressure. After Reset Adjustment, confirm the status by using Cal Status of the cleared block.
The amount of adjustment made by the external zero-adjustment screw can be reset to the initial setting as well.

- Procedure to call up the calibration adjustment parameter (Cal Cmd).
  AI1, AI2 block : Cal Cmd : CAL_CLEAR

7.3.15 Software Write Protect

Hardware write protection and software write protection functions are available for this transmitter.

- Procedure to call up the protection setting parameter (UAP Option)
  UAPMO block : UAP Option

  The following settings can be configured in the UAP Option parameter.

  - Setting to enable or disable changing the setting to the Diagnostic Switch and Diagnostic Configuration parameters.
  - Setting to enable or disable the hardware write protection switch.
  - Setting to enable or disable software write protection.

- Procedure to call up the protection setting display parameter (Hardware Write Protect)
  UAPMO block : Hardware Write Protect

  The Hardware Write Protect parameter enables the switch status of hardware write protection to be displayed.
  For the relationship between hardware write protection and software write protection, refer to section 9. “Parameter Summary.”

7.3.16 Switching to Deep Sleep Mode

When the instrument will not be used for a long time, switch the instrument to deep sleep mode to conserve battery power. To switch to deep sleep mode, follow the procedure below.

- Procedure to call up the switch-to-deep-sleep parameter
  TRANSDUCER block : Special Cmd

  Set Deep Sleep mode(Standby) to the Special Cmd parameter for the TRANSDUCER block. To start from deep sleep mode, either remove and insert the battery pack, or using the provisioning device tool or the device configuration tool via infrared communication.

CAUTION

After setting the deep sleep mode by infrared device configuration tool, keep the infrared port of device away from any other infrared signals.

NOTE

- Transmitter becomes the stop state after setting deep sleep mode and cannot reply any request from the device configuration tool via wireless communication.
- For this reason, there is the case that an error is display on the device configuration tool via wireless communication.
- To wake up from deep sleep mode, please pull battery pack and wait more than 30 seconds before attaching battery pack.

7.3.17 Switching to Silence Mode

This is a function to pause the instrument when it cannot join the field wireless network after a specified time has elapsed. This function is effective in conserving battery power when, for example, the installation of the field wireless integrated gateway is delayed compared to that of field wireless devices. The default value is 28800 seconds (8 hours). Thereafter, a cycle of a one-hour pause and six-minute search is repeated until the instrument can join the field wireless network.

- Procedure to call up the switch-to-silence parameter (Radio Silence)
  UAPMO block : Radio Silence

  Set 0 to 2^{31} seconds for the Radio Silence parameter of the UAPMO block. If 0 is set, the Radio Silence parameter is invalid. To start from deep sleep mode, either remove and insert the battery pack, or use the provisioning device tool or the device configuration tool via infrared communication.

7.4 Self-Diagnostics

7.4.1 Identify Problems by Using the Device Configuration Tool

First, check Diagnostic Status of the self-diagnostic result.

UAPMO block: Diagnostic Status

Any of the four categories (Check function, Maintenance required, Failure, and Off specification) according to NAMUR NE107* is supplied to Diagnostic Status of each diagnostic result.

Table 7.3 Diagnostic Status

Bits	Contents	Example NAMUR NE107 Categorization
Bit31 (MSB)	F: Failure status	---
Bit30	C: Function check status	---
Bit29	O: Out of specification status	---
Bit28	M: Maintenance required status	---
Bit27	Faults in electronics	F
Bit26	Faults in sensor or actuator element	F
Bit25	Installation, calibration problem	C
Bit24	Out of service	C
Bit23	Outside sensor limits	O
Bit22	Environmental conditions out of device specification	O
Bit21	Fault prediction: Maintenance required	M
Bit20	Power is critical low: maintenance need short-term	M
Bit19	Power is low: maintenance need mid-term	M
Bit18	Software update incomplete	C
Bit17	Simulation is active	C
Bit16**	Faults due to process influence	F
Bit15**	Faults due to non-compliance with specified operating conditions	F
Bit14**	Other faults	F
Bit13-Bit08	reserved by WCI	---
Bit07-Bit01	vendor specific area	---
Bit00	Detail information available 1: available 0: no available	---

Checking the Diagnostic Status category allows taking the proper action. The Diagnostic Status contents are common for all ISA devices, and the setting for the Diagnostic Status category can be changed. For further details, refer to Diagnostic Status Detail.
In Diagnostic Status Contents that can be diagnosed by the EJX, the alert category set in Out of Service can be changed to Check function. To do so, follow one of the procedures below.

a) UAPMO block: UAP Option, select enable.
b) UAPMO block: Diagnostic Configuration, change Out of Service from Failure to Check function.
c) UAPMO block: UAP Option, select disable.

The contents of diagnostic status are defined either valid or invalid at Diagnostic Switch parameter. Follow the example below to change “Out of Service” to invalid.

a) UAPMO block: UAP Option, select enable.
b) UAPMO block: Diagnostic Switch, turn ON Turn off “Out of Service”. Out of Service.
c) UAPMO block: UAP Option, select disable.

Note: Be careful when changing the alert category and turning detection on and off as described above. Be sure to set UAP OPTION to disable again to prevent setting errors.

*: NAMUR NE107 “Self-Monitoring and Diagnosis of Field Devices”
In Diagnostic Configuration setting, select one from the followings; F: Failure status, C: Function check status, O: Out of specification status, or M: Maintenance required status.
**: Applicable for Detachable antenna type (Amplifier housing code: 8 or 9).

7.4.2 Alert Report

EJX generates alert information related to Diagnostic Status and automatically sends to a field wireless gateway. To use this function, the following alert setting is necessary. When “Out of Service” for Diagnostic Status alert is required, choose “FALSE” for [Out of Service.Alert Disable] in the UAPMO block. Refer to the field wireless gateway User’s Manual for the setting procedure to obtain the alert information from the gateway.
The alert report consists of the list of parameter names as shown Table 7.4 below.

Table 7.4 Contents of Alert Report

Parameter name	Description
DetectObjectTLPort	Alert detection port UAP (0xF0B2) fixed
DetectObject	Alert detection block UAPMO (1) fixed
DetectTime	Time stamp
AlertDirection	1: generated, 0: clear
AlertPriority	Alert priorities set by users
AlertType	Alert types, see 8.4 Self-Diagnostics
AlertValue	NAMUR107 category 0:Failure, 1:checkFunction, 2:OffSpec, 3:MaintenaceRequired

CAUTION

For a wireless gateway which does not support the alert report function, the alert setting in UAPMO block for the transmitter must be set to “Disable.” Note that YFGW710 field wireless integrated gateway does not have the alert report function.

Table 7.5 Diagnostic Results Summary

Diagnostic Status Contents	Alert Type	NAMUR NE107 Category	Diagnostic Status Detail	Description
Faults in electronics	78	F	AMP_T_SENSOR_FAIL*	Amplifier temperature sensor failure
			AMP_EEPROM_FAIL	Amplifier EEPROM failure
			AMP_EEP_IRREGULAR	AMP EEPROM version not correct
			G_A_COMM_FAIL	G/A failure
			FC_DELTA_T_FAIL	C-side delta T circuit failure
			FR_DELTA_T_FAIL	R-side delta T circuit failure
			WL_AD_FAIL	Battery voltage not detected (AMP failure)
Faults in sensor or actuator element	77	F	FC_SENSOR_FAIL	C sensor frequency failure
			FR_SENSOR_FAIL	R sensor frequency failure
			CAP_T_SENSOR_FAIL	Capsule temperature sensor failure
			CAP_EEPROM_FAIL	Capsule EEPROM failure
			CAP_EEP_IRREGULAR	CAP EEPROM version not correct
			FC_UNOSC_FAIL	C sensor oscillation stop failure
			FR_UNOSC_FAIL	R sensor oscillation stop failure
Installation, calibration problem	76	C	DP_TRIM_SPAN_OUTSIDE	"Pressure span adjustment variable outside of range"
			DP_TRIM_ZERO_OUTSIDE	"Pressure zero adjustment variable outside of range"
			SP_TRIM_SPAN_OUTSIDE	"Static pressure span adjustment variable outside of range"
			SP_TRIM_ZERO_OUTSIDE	"Static pressure zero adjustment variable outside of range"
			LCD_OUTSIDE_LIMIT	LCD display outside of limits
Out of service	75	O	AI1_OUT_OF_SERVICE	AI1 O/S mode
			AI2_OUT_OF_SERVICE	AI2 O/S mode
			AI3_OUT_OF_SERVICE	AI3 O/S mode
Outside sensor limits	74	C	DP_OUTSIDE_LIMIT	Pressure outside of range
			SP_OUTSIDE_LIMIT	Static pressure outside of range
			CAPT_OUTSIDE_LIMIT	Capsule temperature outside of range
			AMPT_OUTSIDE_LIMIT	Amplifier temperature outside of range
Environmental conditions out of device specification.	73	O	DP_OUTSIDE_RANGE	Pressure setting outside of range
			SP_OUTSIDE_RANGE	Static pressure setting outside of range
Power is critical low: maintenance need short-term.	71	M	WL_DEEPSLP_ALM *	Deep sleep due to low battery
			CRITICAL_LOWBAT **	Deep sleep due to low battery
Power is low: maintenance need mid-term	70	M	WL_LOWBAT_ALM	Low battery
Simulation is active	68	C	AI1_SIMULATION_ACTIVE	AI1 Simulation mode
			AI2_SIMULATION_ACTIVE	AI2 Simulation mode
			AI3_SIMULATION_ACTIVE	AI3 Simulation mode

Not applicable for the diagnostic regarding AI2 object and static pressure measurement.
*: Applicable for Integral antenna type (Amplifier housing code: 7).
**: Applicable for Detachable antenna type (Amplifier housing code: 8 or 9).

7.4.3 Checking with Integral Indicator

NOTE

If an error is detected by running self-diagnostics, an error number is displayed on the integral indicator. If there is more than one error, the error number changes at three-second intervals. See Table 8.3 regarding the error codes.

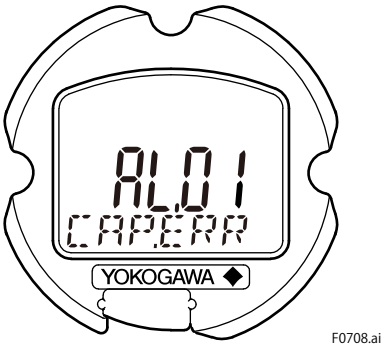


Figure 7.6 Integral Indicator

8. Maintenance

8.1 Overview

WARNING

Since the accumulated process fluid may be toxic or otherwise harmful, take appropriate care to avoid contact with the body or inhalation of vapors when draining condensate or venting gas from the transmitter pressure-detector section and even after dismounting the instrument from the process line for maintenance.

Maintenance of the transmitter is easy due to its modular construction. This chapter describes the procedures for calibration, adjustment, and the disassembly and reassembly procedures required for component replacement.

Transmitters are precision instruments. Please carefully and thoroughly read the following sections for information on how to properly handle them while performing maintenance.

IMPORTANT

- As a rule, maintenance of this transmitter should be done in a maintenance room that has all the necessary tools.
- The CPU assembly, RF assembly and integral indicator contain sensitive parts that can be damaged by static electricity. Take precautions such as using a grounded wrist strap when handling electronic parts or touching the board circuit patterns. Also be sure to place the removed CPU assembly, RF assembly and integral indicator into a bag with an antistatic coating.

8.2 Calibration Instruments Selection

Table 8.1 lists the instruments that can be used to calibrate a transmitter. When selecting an instrument, consider the required accuracy level. Exercise care when handling these instruments to ensure they maintain the specified accuracy.

8.3 Calibration

Use the procedure below to check instrument operation and accuracy during periodic maintenance or troubleshooting.

1) Insert the battery pack and then perform provisioning to have the transmitter join the field wireless network or preparing the infrared communication for calibration.
2) Set measurement mode to continuous using the field device configuration tool and the update period to 1 second using the field wireless configuration tool.
3) Connect the devices as shown in Figure 8.1 and allow the transmitter to warm up for at least 5 minutes.

IMPORTANT

If the measurement range 0% point is 0 kPa or shifted in the positive direction (suppressed zero), the reference pressure should be applied as shown in the figure.
If the measurement range 0% point is shifted in the negative direction (elevated zero), the reference pressure should be applied using a vacuum pump.

4) Apply reference pressures of 0%, 50%, and 100% of the measurement range to the transmitter. Calculate the errors (differences between the device configuration tool readings and reference pressures) as the pressure is increased from 0% to 100% and is decreased from 100% to 0%, and confirm that the errors are within the required accuracy.

(Note) When the output mode is set to “Sg root,” apply reference pressures of 0, 6.25, 25, 56.25, and 100% instead.

5) When the test is finished, reset measurement mode and update time to the initial value using the field device configuration tool and the field wireless configuration tool.

Table 8.1 Instruments Required for Calibration

Name	Yokogawa-recommended Instrument	Remarks
Provisioning device tool	• FieldMate (R2.02.01 or later) • Provisioning Device Tool • Infrared Adapter certified by Yokogawa Supplier: ACTiSYS Product name: IrDA InfraRed USB Adaptor Product number: IR224UN	
Field wireless configuration tool	• Field Wireless Integrated Gateway attached Software Field Wireless Configurator Field Wireless Management Tool • Field Wireless System related Product Plant Resource Manager (PRM) (R3.05 or later) • Device Configuration Tool via Wireless Communication FieldMate(R2.02.01 or later) DeviceFile(R3.01.01 or later) • Device Configuration Tool via Infrared Communication FieldMate(R2.03.00 or later) DeviceFile(R3.02.01 or later)	
Digital manometer	Model MT220 precision digital manometer 1) For 10 kPa class Accuracy: ±(0.015% of rdg + 0.015% of F.S.) for 0 to 10 kPa ±(0.2% of rdg + 0.1% of F.S.) . . . . . for -10 to 0 kPa 2) For 130 kPa class Accuracy: ±0.02% of rdg . . . . . for 25 to 130 kPa ±5digits . . . . . for 0 to 25 kPa ±(0.2% of rdg + 0.1% of F.S.) . . . . . for -80 to 0 kPa 3) For 700 kPa class Accuracy: ±(0.02% of rdg + 3digits) . . . . . for 100 to 700 kPa ±5 digits . . . . . for 0 to 100 kPa ±(0.2% of rdg + 0.1% of F.S.) . . . . . for -80 to 0 kPa 4) For 3000 kPa class Accuracy: ±(0.02% of rdg + 10 digits) . . . . . for 0 to 3000 kPa ±(0.2% of rdg + 0.1% of F.S.) . . . . . for -80 to 0 kPa 5) For 130 kPa abs class Accuracy: ±(0.03% of rdg + 6 digits) . . . . . for 0 to 130 kPa abs	Select a manometer having a pressure range close to that of the transmitter.
Pressure generator	Model MC100 pneumatic pressure standard for 200 kPa {2 kgf/cm^2}, 25 kPa {2500 mmH$_2$O} Accuracy: ±0.05% of F.S.	Requires air pressure supply.
	Dead weight gauge tester 25 kPa {2500 mmH$_2$O} Accuracy: ±0.03% of setting	Select the one having a pressure range close to that of the transmitter.
Pressure source	Model 6919 pressure regulator (pressure pump) Pressure range: 0 to 133 kPa {1000 mmHg}	Prepare the vacuum pump for negative pressure ranges.

Note: The above table contains the instruments capable of performing calibration to the 0.2% level. Since special maintenance and management procedures involving traceability of each instrument to higher-level standards are required for calibration to the 0.1% or higher level, there may be difficulties in calibration to this level in the field. For calibration to the 0.1% level, contact Yokogawa representatives from which the instrument was purchased or the nearest Yokogawa office.

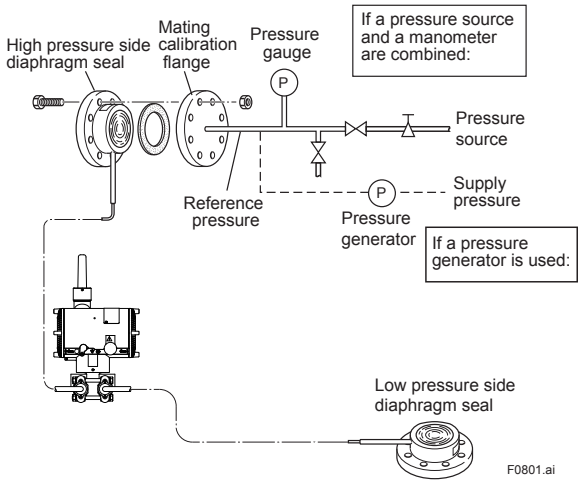


Figure 8.1 Instrument Connections

8.4 Disassembly and Reassembly

CAUTION

Precautions for the intrinsic safety explosion prevention type instrument

Intrinsic safe type transmitters must be, as a rule, removed to a non-hazardous area for maintenance and be disassembled and reassembled to the original state. Check and confirm the insulation when it is reassembled to the original state.
Check and confirm the insulation when it is reassembled to the original state.
Refer to section 2.7 “Insulation Resistance and Dielectric Strength Test” for details of Resistance Test.

IMPORTANT

- Perform the provisioning when replacing the RF assembly. Refer to 6.4 Connecting to the Field Wireless Network for details.
- Replace the batteries and perform the parameter settings when replacing the CPU assembly. Refer to 8.4.5 Replacing the Batteries.

This section describes procedures for disassembly and reassembly for maintenance and component replacement.

Table 8.2 shows the tools required.

Table 8.2 Tools for Disassembly and Reassembly

Tool	Quantity	Remarks
Phillips screwdriver	1	JIS B4633, No. 2
Slotted screwdriver	1	
Allen wrenches	3	JIS B4648 One each, nominal 3, 4 and 2.5 mm Allen wrenches
Wrench	1	Width across flats, 17 mm
Torque wrench	1	
Adjustable wrench	1	
Socket wrench	1	Width across flats, 16 mm
Socket driver	1	Width across flats, 5.5 mm
Tweezers	1	

CAUTION

Always remove Battery pack and shut off pressures before disassembly and assembly.
Use proper tools for all operations.

8.4.1 Replacing the Integral Indicator

This subsection describes the procedure for replacing an integral indicator. (See figure 8.2)

■ **Removing the Integral Indicator**

1) Remove the cover.
2) While supporting the integral indicator with one hand, loosen its two mounting screws.
3) Dismount the integral indicator from the RF assembly.
   When doing this, carefully pull the integral indicator straight forward so as not to damage the connector pins between it and the RF assembly.

■ **Attaching the Integral Indicator**

1) Align both the integral indicator and RF assembly connectors and engage them.
2) Insert and tighten the two mounting screws.
3) Replace the cover.

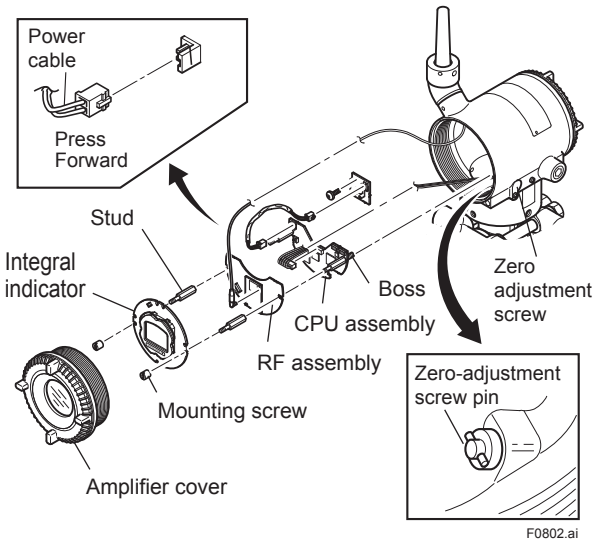


Figure 8.2 Removing and Attaching Integral indicator, RF assembly and CPU Assembly

8.4.2 Replacing the RF Assembly

This subsection describes how to replace the RF assembly (see Figure 8.2).

■ **Removing the RF assembly**

1) Remove the cover.
2) Remove the integral indicator (refer to subsection 8.4.1).
3) Remove the two stud bolts by using a socket driver (width across flats: 5.5 mm).
4) Disconnect the RF assembly from the CPU assembly. When doing this, carefully pull the RF assembly straight forward so as not to damage the connector pins between it and the CPU assembly.
5) Disconnect the antenna cable that connects the RF assembly and the antenna.

NOTE

Be careful not to apply excessive force to the RF assembly and the connector of the antenna cable when removing it.

■ **Mounting the RF assembly**

1) Connect the antenna cable between the RF assembly and the antenna.
2) Align both the RF assembly and CPU assembly connectors and engage them.
3) Tighten the two stud bolts.
4) Mount the integral indicator (refer to subsection 8.4.1).
5) Replace the cover.

8.4.3 Replacing the CPU Assembly

This subsection describes how to replace the CPU assembly (see Figure 8.2).

■ **Removing the CPU assembly**

1) Remove the cover.
   Remove the integral indicator and the RF assembly (refer to subsections 8.4.1 and 8.4.2).
2) Turn the zero-adjustment screw to the position as shown in Figure 8.2.
3) Disconnect the power cable (cable with brown connector at the end).
   When doing this, lightly press the side of the CPU assembly connector and pull the cable connector to disengage (see the upper left of Figure 8.2).
4) Use a socket driver (width across flats, 5.5 mm) to loosen the two bosses.
5) Carefully pull the CPU assembly straight forward to remove it.
6) Disconnect the flat cable (cable with white connector at the end) that connects the CPU assembly and the capsule.

NOTE

Be careful not to apply excessive force to the CPU assembly when removing it.

■ **Mounting the CPU assembly**

1) Connect the flat cable (with white connector) between the CPU assembly and the capsule.
2) Connect the power cable (with brown connector) to the CPU assembly.

NOTE

Make certain that the cables do not get pinched between the case and the edge of the CPU assembly.

3) Align and engage the zero-adjustment screw pin with the groove on the bracket on the CPU assembly. Then insert the CPU assembly straight onto the post in the amplifier case.
4) Tighten the two bosses. Mount the RF assembly, and the integral indicator (refer to subsections 8.4.1 and 8.4.2).

IMPORTANT

Confirm that the zero-adjustment screw pin is placed properly in the groove on the bracket prior to tightening the two bosses. If it is not, the zero-adjustment mechanism will be damaged.

5) Replace the cover.

8.4.4 Replacing the Battery Pack

Regarding the transmitter with intrinsically safe approval, the battery pack can be replaced without removing the device in hazardous area.

■ **Preparation**

Initialize the remaining battery life by using the parameter of Reset Energy Left in UAPMO block. When the battery power is burned and emptied, initialize the remaining battery after prompt replacement of the battery pack.

■ **Removing**

1) Remove the terminal box cover.
2) Loosen the two battery pack mounting screws (see Figure 8.3).
3) Pull out the Battery pack.

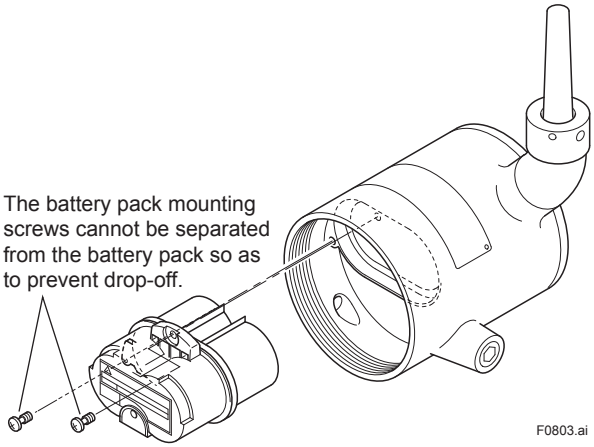


Figure 8.3 Removing the Battery Pack

■ **Remounting**

1) Insert the new battery pack lightly.
2) Push the center of the battery pack and insert it securely.
3) Tighten the two battery pack mounting screws to a torque of approximately 0.7 N·m.
4) Replace the terminal box cover.

8.4.5 Replacing the Batteries

The batteries in the battery pack can be replaced. Batteries are not installed when shipped from the factory. Assemble the battery pack as follows.

WARNING

Be sure to replace the batteries or disassemble and assemble the battery pack in a safe location. Doing so in an explosive area could cause an explosion.

CAUTION

When replacing the batteries, be sure to replace the two batteries at the same time and do not use an old and a new battery together.

■ **Disassembling**

1) Loosen the two battery case mounting screws (Figure 8.4).
2) Separate the battery case into two parts.
3) Remove the old batteries.

■ **Assembling**

1) Insert new batteries into the battery case. Be careful of the orientation of the batteries.
2) Attach the two parts of the battery case to each other.
3) Tighten the two battery case mounting screws to a torque of approximately 0.7 N·m.

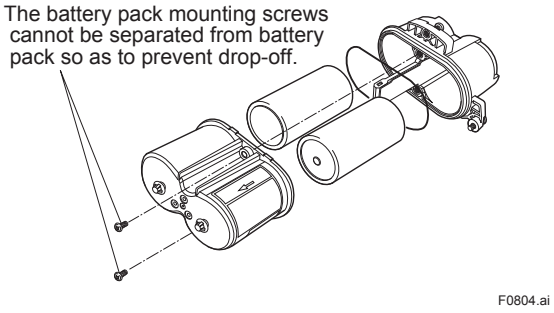


Figure 8.4 Removing the Battery Pack

8.4.6 Handling Batteries

This battery pack uses two primary lithium/ thionyl chloride batteries. Each battery contains approximately 5 grams of lithium, for a total of 10 grams in each pack. Under normal conditions, the battery materials are self-contained and are not reactive as long as the batteries and the pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Protect the electrode of the battery pack to avoid rapid electrical discharge. Discharged a battery may lead to fluid leakage and excessive heat. Batteries should be stored in a clean and dry area. For maximum battery life, storage temperature should not exceed 30°C.

WARNING

Handling the battery pack
The following precautions must be observed in order to safely and effectively use a battery pack. Improper use may lead to fluid leakage, excessive heat, ignition, or explosion.

- Never charge it.
- Do not short-circuit it.
- Do not disassemble, transform, or modify it.
- Do not heat it or throw it into a fire.
- Do not soak it in fresh water or seawater.

CAUTION

Observe the following precautions for the safe disposal of batteries.

- Do not incinerate the battery, and do not expose it to a high temperature of 100°C or more. This may lead to fluid leakage or explosion.
- Dispose of the battery according to laws and regulations.

Use the following dedicated parts for the battery pack and batteries.

- Battery Pack
  Part number: F9915NQ (with batteries)
  Part number: F9915NK (without batteries)
- Batteries
  Part number: F9915NR
  Alternatively, Tadiran TL-5930/S batteries may be purchased and used.

- **Transportation of products containing lithium batteries:**

Batteries used for this transmitter contain lithium. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by the International Air Transport Association (IATA), the International Civil Aviation Organization (ICAO), and the European Ground Transportation of Dangerous Goods (ARD). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping. When transporting this transmitter with the battery pack inserted, keep it in deep sleep mode in order to conserve battery power. For details on how to switch to deep sleep mode, refer to subsection 7.3.16 “Switching to Deep Sleep Mode.”

- **How to replace and dispose of the batteries:**

This is an explanation about the new EU Battery Directive(DIRECTIVE 2006/66/EC). This directive is only valid in the EU.
Batteries are used for this product. When you remove batteries from this product and dispose them, discard them in accordance with domestic law concerning disposal.
Take a right action on waste batteries, because the collection system in the EU on waste batteries are regulated.

Battery type: Primary lithium-thionyl chloride battery

CAUTION

The symbol (see above), which is marked on the batteries, means they shall be sorted out and collected as ordained in ANNEX II in DIRECTIVE 2006/66/EC.

- **Procedure to remove the batteries safely:**

Refer to subsection 8.4.6 “Replacing the Battery Pack” and subsection 8.4.7 “Replacing the Batteries.”

8.5 Troubleshooting

If any abnormality appears in the measured values, use the troubleshooting flow chart below to isolate and remedy the problem. Since some problems have complex causes, these flow charts may not identify all. If you have difficulty isolating or correcting a problem, contact Yokogawa service personnel.

8.5.1 Basic Troubleshooting

First determine whether the process variable is actually abnormal or a problem exists in the measurement system.

If the problem is in the measurement system, isolate the problem and decide what corrective action to take.

This transmitter is equipped with a self-diagnostic function which will be useful in troubleshooting, and the transmitter equipped with an integral indicator will show an alarm code as a result of self-diagnosis.
See subsection 8.5.3 for the list of alarms.
See also each communication manual.

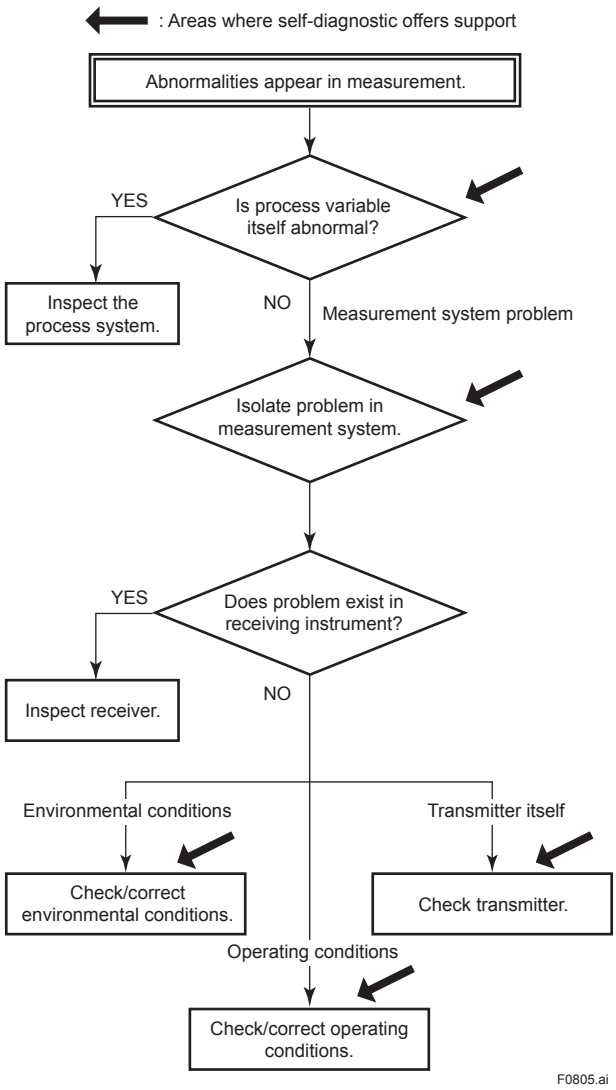
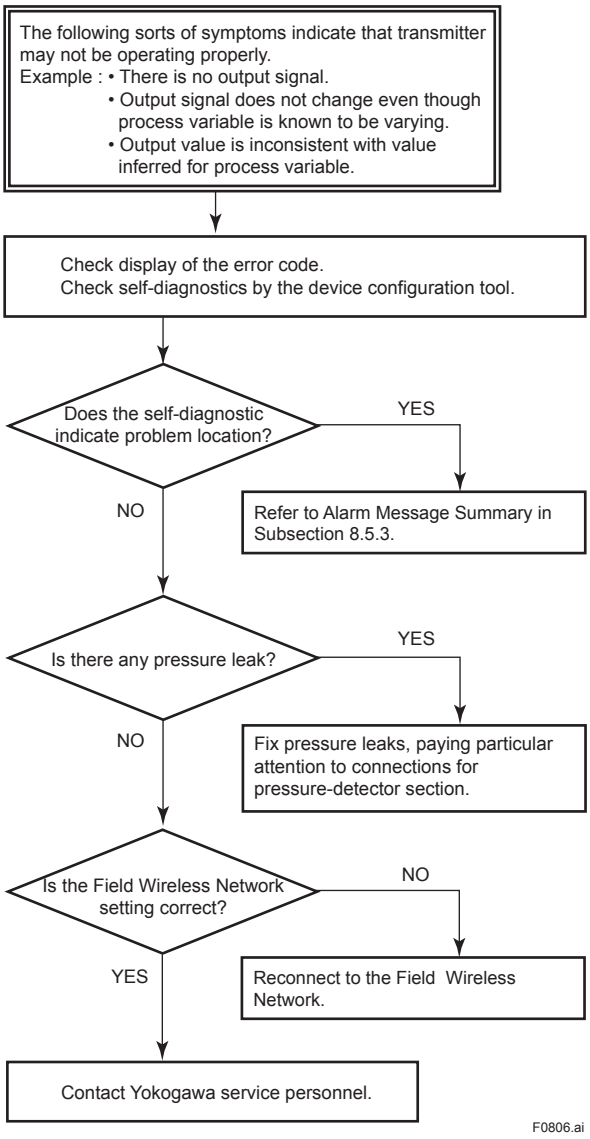
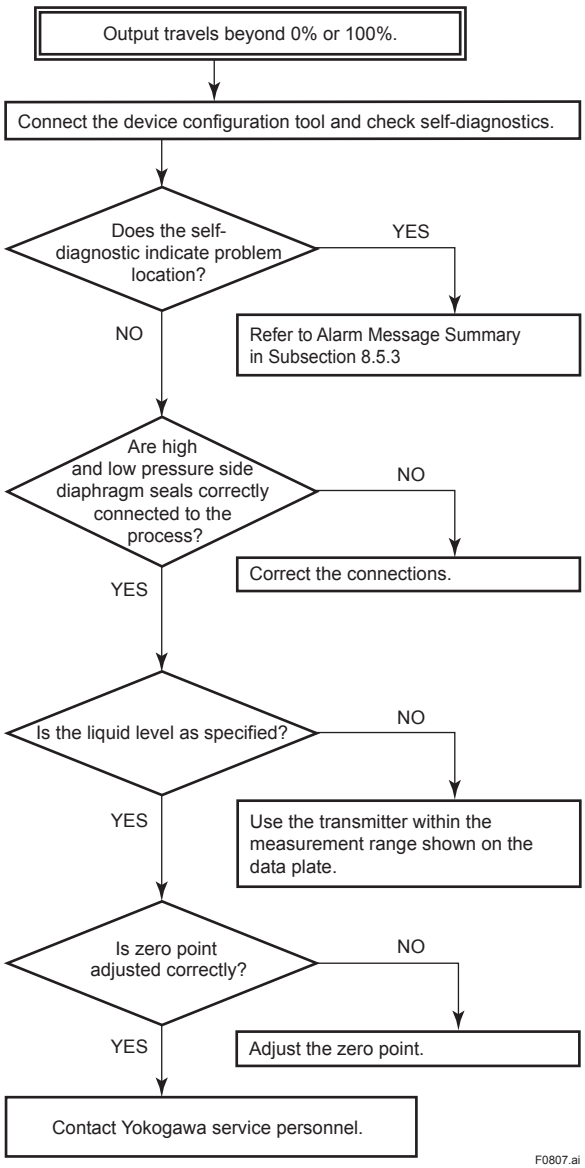
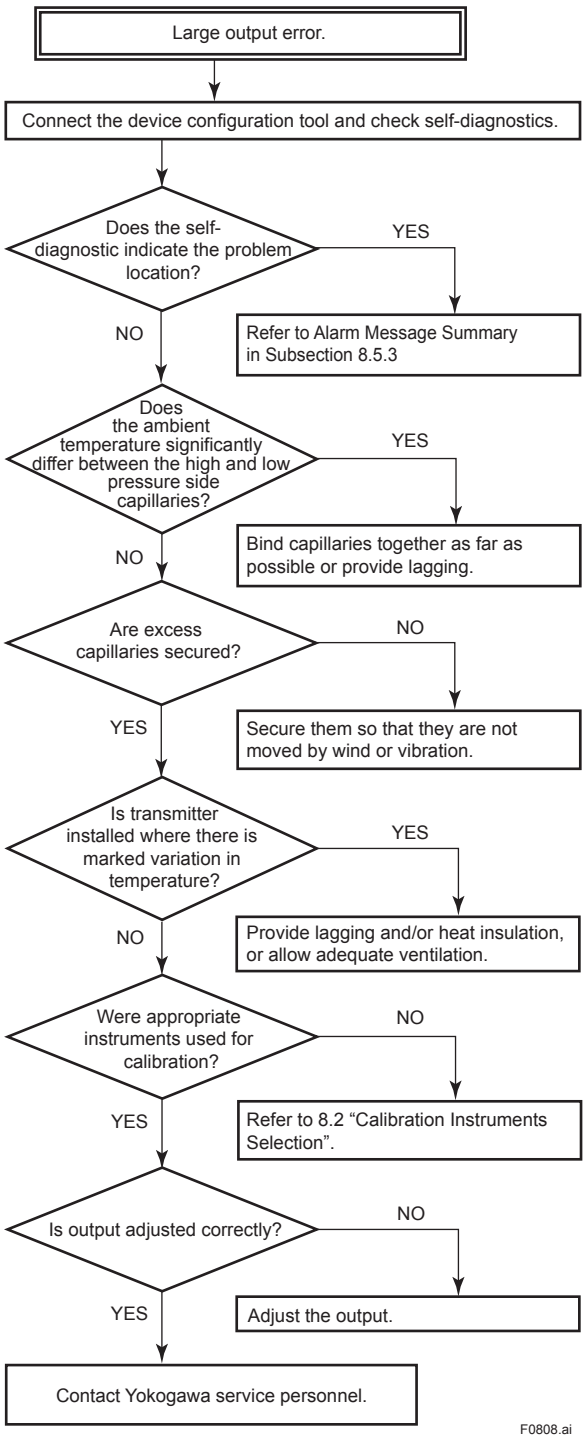


Figure 8.5 Basic Flow and Self-Diagnostics

8.5.2 Troubleshooting Flowcharts


The following sorts of symptoms indicate that transmitter may not be operating properly.
Example : • There is no output signal.
• Output signal does not change even though process variable is known to be varying.
• Output value is inconsistent with value inferred for process variable.
Check display of the error code.
Check self-diagnostics by the device configuration tool.
Does the self-diagnostic indicate problem location?
YES
Refer to Alarm Message Summary in Subsection 8.5.3.
NO
Is there any pressure leak?
YES
Fix pressure leaks, paying particular attention to connections for pressure-detector section.
NO
Is the Field Wireless Network setting correct?
NO
Reconnect to the Field Wireless Network.
YES
Contact Yokogawa service personnel.
F0806.ai


Output travels beyond 0% or 100%.
Connect the device configuration tool and check self-diagnostics.
Does the self-diagnostic indicate problem location?
YES
Refer to Alarm Message Summary in Subsection 8.5.3
NO
Are high and low pressure side diaphragm seals correctly connected to the process?
NO
Correct the connections.
YES
Is the liquid level as specified?
NO
Use the transmitter within the measurement range shown on the data plate.
YES
Is zero point adjusted correctly?
NO
Adjust the zero point.
YES
Contact Yokogawa service personnel.
F0807.ai


Large output error.
Connect the device configuration tool and check self-diagnostics.
Does the self-diagnostic indicate the problem location?
YES
Refer to Alarm Message Summary in Subsection 8.5.3
NO
Does the ambient temperature significantly differ between the high and low pressure side capillaries?
YES
Bind capillaries together as far as possible or provide lagging.
NO
Are excess capillaries secured?
NO
Secure them so that they are not moved by wind or vibration.
YES
Is transmitter installed where there is marked variation in temperature?
YES
Provide lagging and/or heat insulation, or allow adequate ventilation.
NO
Were appropriate instruments used for calibration?
NO
Refer to 8.2 “Calibration Instruments Selection”.
YES
Is output adjusted correctly?
NO
Adjust the output.
YES
Contact Yokogawa service personnel.
F0808.ai

8.5.3 Errors and Countermeasures

Table 8.3 Error Message Summary (Causes and Actions)

Integral indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Cause	Release/ recovery conditions (except restart)	Action
AL. 01 CAP. ERR *2	F	Bit 26	Faults in sensor or actuator element	FC_SENSOR_FAIL	Pressure sensor failure	Recovers only when AUTO RECOVER is ON and within the range	Replace the capsule.
				FR_SENSOR_FAIL			
				FC_UNOSC_FAIL		Recovers only when AUTO RECOVER is ON and oscillation does not stop	
				FR_UNOSC_FAIL			
				CAP_T_SENSOR_FAIL	Capsule temperature sensor failure	None	
				CAP_EEPROM_FAIL	Capsule EEPROM memory failure	Recovers when returns to normal.	
				CAP_EEP_IRREGULAR		None	
AL. 02 AMP. ERR *2	F	Bit 27	Faults in electronics	AMP_T_SENSOR_FAIL*3	Amplifier temperature sensor failure	None	Replace the amplifier.
				AMP_EEPROM_FAIL	Amplifier EEPROM failure	Recovers when returns to normal.	
				AMP_EEP_IRREGULAR		None	
				FC_DELTA_T_FAIL	Amplifier failure	None	
				FR_DELTA_T_FAIL			
				G_A_COMM_FAIL			
				WL_AD_FAIL			
AL. 10 PRESS	O	Bit 23	Outside sensor limits	DP_OUTSIDE_LIMIT	Pressure outside of specified range	Recovers when input pressure returns within the range.	Check the input pressure.
AL. 11 ST. PRSS				SP_OUTSIDE_LIMIT	Static pressure outside of specified range	Recovers when static pressure returns within the range.	Check the input pressure.
AL. 12 CAP. TMP				CAPT_OUTSIDE_LMIT	Capsule temperature outside of range (-50 to 130°C)	Recovers when temperature returns within the range.	Retain heat or insulate so that temperature returns within the specified range.
AL. 13 AMP.TMP				AMPT_OUTSIDE_LIMIT	Amplifier temperature outside of range (-50 to 95°C)	Recovers when temperature returns within the range.	Retain heat or insulate so that temperature returns within the specified range.

Integral indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Cause	Release/ recovery conditions (except restart)	Action
AL.53 P. ADJ	C	Bit 25	Installation, calibration problem	DP_TRIM_SPAN_OUTSIDE	Pressure span adjustment variable outside of range	Recovers when span adjustment variable/point returns within the range.	Check the span adjustment variable for the Pressure.
AL.53 P. ADJ				DP_TRIM_ZERO_OUTSIDE	Pressure zero adjustment variable outside of range	Recovers when zero adjustment variable/point returns within the range.	Check the zero adjustment variable for the Pressure.
AL. 55 SP. ADJ	C	Bit 25	Installation, calibration problem	SP_TRIM_SPAN_OUTSIDE	Static pressure span adjustment variable outside of range	Recovers when span adjustment variable /point returns within the range.	Check the static pressure span adjustment variable.
AL. 55 SP. ADJ				SP_TRIM_ZERO_OUTSIDE	Static pressure zero adjustment variable outside of range	Recovers when zero adjustment variable/point returns within the range.	Check the static pressure zero adjustment variable.
AL. 79 OV. DISP				LCD_OUTSIDE_LIMIT	LCD display outside of specified range	Recovers when display value returns within the range.	Check the display setting.
AL. 30 RANGE	O	Bit 22	Environmental conditions out of device specification	DP_OUTSIDE_RANGE	Input pressure setting outside of range	Recovers when setting returns within the range.	Check the input pressure setting.
AL. 31 SP. RNG				SP_OUTSIDE_RANGE	Static pressure setting outside of range	Recovers when setting returns within the range.	Check the static pressure setting.
AL. 70 LOWBAT	M	Bit 20	Power is critical low: maintenance need short - term	WL_DEEPSLP_ALM*3	Low remaining battery voltage results in switching to deep sleep.	None	Replace the batteries.
				CRITICAL_LOWBAT*4	Battery voltage is the lowest.		
AL. 70 LOWBAT		Bit 19	Power is low: maintenance need mid - term	WL_LOWBAT_ALM	Low remaining battery voltage	None	Replace the batteries.
AL. 60 AI OOS	C	Bit 24	O/S	AI1_OUT_OF_SERVICE	AI1 block is O/S mode.	Returns when the mode target of AI1 block is other than O/S.	Set the mode target to AUTO.
AL. 61 AI OOS				AI2_OUT_OF_SERVICE	AI2 block is O/S mode.	Returns when the mode target of AI2 block is other than O/S.	Set the mode target to AUTO.
AL. 62 AI OOS				AI3_OUT_OF_SERVICE	AI3 block is O/S mode.	Returns when the mode target of AI3 block is other than O/S.	Set the mode target to AUTO.

Integral indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Cause	Release/ recovery conditions (except restart)	Action
AL. 63 AI SIM	C	Bit 17	Simulation is active	SimulationActive (AI1)	AI1 block is simulate mode.	Returns when the simulate mode of AI1 block is set to disable. 1 (Disable)	Check the simulate mode of AI1 block.
AL. 64 AI SIM				SimulationActive (AI2)	AI2 block is simulate mode.	Returns when the simulate mode of AI2 block is set to disable. 1 (Disable)	Check the simulate mode of AI2 block.
AL. 65 AI SIM	C	Bit 17	Simulation is active	SimulationActive (AI3)	AI3 block is simulate mode.	Returns when the simulate mode of AI3 block is set to disable. 1 (Disable)	Check the simulate mode of AI3 block.

1: "Factory NAMUR category" refers to the four categories (C: Check function, M: Maintenance required, F: Failure, and O: Off specification) according to NAMUR NE107.
* NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"
*2: When the device detects "AL01 CAP.ERR" and "AL02 AMP.ERR", the LCD display stays on regardless of the status in LCD mode.
*3: Applicable for Integral antenna type (Amplifier housing code: 7).
*4: Applicable for Detachable antenna type (Amplifier housing code: 8 or 9).

Table 8.4 Error Message Summary (Output Actions)

Integral Indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Output actions			
					Pressure	Static Pressure	Capsule Temp Value	Amp Temp Value
AL. 01 CAP. ERR *2	F	Bit 26	Faults in sensor or actuator element	FC_SENSOR_FAIL	Output value (hold value) Output status (BAD: Sensor Failure)	Output value (hold value) Output status (BAD: Sensor Failure)	Normal action	Normal action
				FR_SENSOR_FAIL				
				FC_UNOSC_FAIL				
				FR_UNOSC_FAIL				
				CAP_T_SENSOR_FAIL	Normal action	Normal action	Output value (calculated in a normal way) Output status (BAD: Sensor Failure)	
				CAP_EEPROM_FAIL	Output value (hold value) Output status (BAD: Device Failure)	Output value (hold value) Output status (BAD: Device Failure)	Output value (calculated in a normal way) Output status (BAD: Device Failure)	Output value (calculated in a normal way) Output status (BAD: Device Failure)
				CAP_EEP_IRREGULAR				
AL. 02 AMP.ERR *2	F	Bit 27	Faults in electronics	AMP_T_SENSOR_FAIL*3	Normal action	Normal action	Normal action	Output value (calculated in a normal way) Output status (BAD: Sensor Failure)
				AMP_EEPROM_FAIL	Output value (hold value) Output status (BAD: Device Failure)	Output value (hold value) Output status (BAD: Device Failure)	Output value (calculated in a normal way) Output status (BAD: Device Failure)	Output value *4 (hold value) Output status (BAD: Device Failure)
				AMP_EEP_IRREGULAR				
				FC_DELTA_T_FAIL	Output value (hold value) output status (BAD: Device Failure) Output value (calculated in a normal way) Output status (BAD: Device Failure)	Output value (hold value) Output status (BAD: Device Failure)	Normal action	Output value *4 (hold value) output status (BAD: Device Failure)
				FR_DELTA_T_FAIL				
				G_A_COMM_FAIL			Output value (calculated in a normal way) Output status (BAD: Device Failure)	Output value (calculated in a normal way) Output status (BAD: Device Failure)
				WL_AD_FAIL				

Integral Indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Output actions			
					Pressure	Static Pressure	Capsule Temp Value	Amp Temp Value
AL. 10 PRESS	O	Bit 23	Outside sensor limits	DP_OUTSIDE_LIMIT	Output value (calculated in a normal way) Output status (UNCERTAIN: Sensor Conversion not Accurate)	Output value (calculated in a normal way) Output status (UNCERTAIN: Non Specific)	Normal action	Normal action
AL. 11 ST. PRSS				SP_OUTSIDE_LIMIT	Output value (calculated in a normal way) Output status (UNCERTAIN: Non Specific)	Output value (calculated in a normal way) Output status (UNCERTAIN: Sensor Conversion not Accurate)	Normal action	Normal action
AL. 12 CAP. TMP				CAPT_OUTSIDE_LIMIT	Output value (calculated in a normal way) Output status (UNCERTAIN: Non Specific)	Output value (calculated in a normal way) Output status (UNCERTAIN: Non Specific)	Output value (calculated in a normal way) Output status (UNCERTAIN: Sensor Conversion not Accurate)	Normal action
AL. 13 AMP. TMP				AMPT_OUTSIDE_LIMIT	Normal action	Normal action	Normal action	Output value (calculated in a normal way) Output status (UNCERTAIN: Sensor Conversion not Accurate)
AL. 53 P. ADJ	C	Bit 25	Installation, calibration problem	DP_TRIM_SPAN_ OUTSIDE	Output value (calculated in a normal way) Output status (UNCERTAIN: Range Limits Exceeded)	Normal action	Normal action	Normal action
AL. 53 P. ADJ				DP_TRIM_ZERO_ OUTSIDE	Output value (calculated in a normal way) Output status (UNCERTAIN: Range Limits Exceeded)	Normal action	Normal action	Normal action
AL. 55 SP. ADJ				SP_TRIM_SPAN_ OUTSIDE	Normal action	Output value (calculated in a normal way) Output status (UNCERTAIN: Range Limits Exceeded)	Normal action	Normal action
AL. 55 SP.ADJ				SP_TRIM_ZERO_ OUTSIDE	Normal action	Output value (calculated in a normal way) Output status (UNCERTAIN: Range Limits Exceeded)	Normal action	Normal action
AL. 79 OV. DISP				LCD_OUTSIDE_LIMIT	Normal action	Normal action	Normal action	Normal action

Integral Indicator	Factory NAMUR category	Bit	Diagnostic Status	Diagnostic Status Detail	Output actions			
					Pressure	Static Pressure	Capsule Temp Value	Amp Temp Value
AL. 30 RANGE	O	Bit 22	Environmental conditions out of device specification	DP_OUTSIDE_RANGE	Normal action	Normal action	Normal action	Normal action
AL. 31 SP. RNG				SP_OUTSIDE_RANGE	Normal action	Normal action	Normal action	Normal action
AL. 70*6 LOWBAT	M	Bit 20	Power is critical low: maintenance need short - term	WL_DEEPSLP_ALM*3	Normal action	Normal action	Normal action	Normal action
				CRITICAL_LOWBAT*4				
AL. 70*6 LOWBAT		Bit 19	Power is low: maintenance need mid - term	WL_LOWBAT_ALM	Normal action	Normal action	Normal action	Normal action
AL. 60 AI OOS	C	Bit 24	O/S	AI1_OUT_OF_SERVICE	Output value (hold value) Output status (BAD: Out of Service)	Normal action	Normal action	Normal action
AL. 61 AI OOS				AI2_OUT_OF_SERVICE	Normal action	Output value (hold value) Output status (BAD: Out of Service)	Normal action	Normal action
AL. 62 AI OOS				AI3_OUT_OF_SERVICE	Normal action	Normal action	Output value (hold value) Output status (BAD: Out of Service)	Output value (hold value) Output status (BAD: Out of Service)
AL. 63 AI SIM	C	Bit 17	Simulation is active	SimulationActive (AI1)	Normal action	Normal action	Normal action	Normal action
AL. 64 AI SIM				SimulationActive (AI2)	Normal action	Normal action	Normal action	Normal action
AL. 65 AI SIM				SimulationActive (AI3)	Normal action	Normal action	Normal action	Normal action

1: "Factory NAMUR category" refers to the four categories (C: Check function, M: Maintenance required, F: Failure, and O: Off specification) according to NAMUR NE107.
* NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"
*2: When the device detects "AL01 CAP.ERR" and "AL02 AMP.ERR", the LCD display stays on regardless of the status in LCD mode.
*3: Applicable for Integral antenna type (Amplifier housing code: 7).
*4: Amplifier temperature value is calculated in a normal way for Detachable antenna type (Amplifier housing code: 8 or 9).
*5: Applicable for Detachable antenna type (Amplifier housing code: 8 or 9).
*6: When the ambient temperature is higher than 60°C, AL.70 may be generated despite the indication of Energy Left shows sufficiently remained. However, it does not affect the device operation. This is caused by the change of battery inner status with extremely low power consumption under high temperature environment. It is recommended to set the data updating period to 15 seconds or shorter.

9. Parameter Summary

Table 9.1 Parameter

<table>
<tr><th>Object ID</th><th>Attribute ID</th><th>Label</th><th>Description</th><th>Default value</th><th>Handling</th></tr>
<tr><td rowspan="13">1.
UAPMO
block</td><td>1</td><td>Version Revision</td><td>Indicates the application revision of EJX This revision when the application software is downloaded.</td><td>---</td><td>R</td></tr>
<tr><td>10</td><td>Static Revision</td><td>Indicates the revision level of the fixed parameters of UAP Used, for example, to check whether parameters have been change.</td><td>0</td><td>R</td></tr>
<tr><td>64</td><td>Identification Number</td><td>Indicates the vender ID, model ID, and revision of the device.</td><td>---</td><td>R</td></tr>
<tr><td>65</td><td>CTS Version</td><td>Indicates the version of the communication stack test system (CTS).</td><td>0</td><td>R</td></tr>
<tr><td>66</td><td>ITS Version</td><td>Indicates the version of the inter operability test system (ITS).</td><td>0</td><td>R</td></tr>
<tr><td>67</td><td>Diagnostic Status</td><td>Indicates the diagnostic results of the device based on the NAMUR NE107*1 model.
Setting Enable diagnostic status configuration in UAP Option to Enable allows turning OFF and ON the display of the diagnostic results for each summary, and changing Categorize For Categorize at the time of shipment, refer to tables 7.3 and 9.2.</td><td>---</td><td>R</td></tr>
<tr><td>68</td><td>UAP Option</td><td>Allows setting the Diagnostic Status and write protection of UAP.
Software write protect
1: On, 0: Off
Enable hardware write protect
1: Enable, 0: Disable (default)
Enable diagnostic status configuration
1: Enable, 0: Disable (default)
The following table shows the relationship between the hardware write protection and software write protection.
<table>
<tr><th>Enable hardware write protect</th><th>Hardware write protect</th><th>Software write protect</th><th>Write protect</th></tr>
<tr><td>Disable</td><td>Off or On</td><td>Off</td><td>No (Writable)</td></tr>
<tr><td>Disable</td><td>Off or On</td><td>On</td><td>Yes (Unwritable)</td></tr>
<tr><td>Enable</td><td>Off</td><td>Off or On</td><td>No (Writable)</td></tr>
<tr><td>Enable</td><td>On</td><td>Off or On</td><td>Yes (Unwritable)</td></tr>
</table></td><td>0</td><td>W</td></tr>
<tr><td>69</td><td>Diagnostic Switch</td><td>Allows setting On/Off for each summary of Diagnostic Status when Enable diagnostic status configuration in UAP Option is set to Enable.</td><td>On</td><td>W</td></tr>
<tr><td>70</td><td>Diagnostic Configuration</td><td>Allows Categorize for each summary of Diagnostic Status when Enable diagnostic status configuration in UAP Option is set to Enable.</td><td>Refer to Table 9.2.</td><td>W</td></tr>
<tr><td>102</td><td>Diagnostic Status Detail[2]</td><td>Detailed information on Diagnostic Status. For Categorize at the time of shipment, refer to Table 9.2.</td><td>Refer to Table 9.2.</td><td>R</td></tr>
<tr><td>103</td><td>Energy Left</td><td>Indicates the number of days of remaining battery life assuming ambient temperature condition as 23 degrees Celsius.
The unit is day.</td><td>---</td><td>R</td></tr>
<tr><td>104</td><td>Reset Energy Left</td><td>Initialize the remaining battery life (Energy Left) and reset it as new batteries.
Perform the battery replacement.
0 = Continue (Cancel)
1 = Reset (Initialization)</td><td>0 (reading value is always 0)</td><td>W</td></tr>
</table>

Object ID	Attribute ID	Label	Description	Default value	Handling
1. UAPMO block (continued)	105	Power Supply Status	Indicates the predicted battery level and the power supply method. 0 = external power supply 1 = battery level 75% or more 2 = battery level 25% ~ 75% 3 = battery level 25% or less		R
	106	EHType*2	Available to write note into this parameter.	---	W
	107	Power Supply Voltage*2	Indicates the measured power supply voltage (V).	---	R
	110	Hardware Write Protect	Allows recognizing the status of the hardware write protection switch. (Switch Off, Switch On)		R
	111	Radio Silence	Repeats a cycle of a 1-hour pause and 6-minute search if the instrument cannot join the network after a time specified in Radio Silence has elapsed. When 0 is set, the Radio Silence is invalid.	28800	W
	112	Simulation Active Alert*2	The On/Off or priority for Simulation Active Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	113	Soft Update incomplete Alert*2	The On/Off or priority for Soft Update incomplete Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for EJX.	1. TRUE 2. 15	W
	114	Power low Alert*2	The On/Off or priority for Power low Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	115	Power Critical low Alert*2	The On/Off or priority for Power Critical low Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	116	Fault prediction Alert*2	The On/Off or priority for Fault prediction Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for EJX.	1. TRUE 2. 15	W
	117	Environmental conditions Alert*2	The On/Off or priority for Environmental conditions Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	118	Outside sensor limits Alert*2	The On/Off or priority for Outside sensor limits Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	119	Out of service Alert*2	The On/Off or priority for Out of service Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	120	Callibration problem Alert*2	The On/Off or priority for callibration problem Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W

Object ID	Attribute ID	Label	Description	Default value	Handling
1. UAPMO block (continued)	121	Faults Sensor or actuator Alert*2	The On/Off or priority for Faults Sensor or actuator Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15	1. TRUE 2. 15	W
	122	Faults Electronics Alert*2	The On/Off or priority for Faults Electronics Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 1	1. TRUE 2. 15	W
	123	Faults process influence Alert*2	The On/Off or priority for Faults process influence Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for EJX.	1. TRUE 2. 15	W
	124	Faults non-compliance Alert*2	The On/Off or priority for Faults non-compliance Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for EJX.	1. TRUE 2. 15	W
	125	Other faults Alert*2	The On/Off or priority for Other faults Alert can be set. 1. On/Off setting 0 = FALSE, 255 =TRUE 2. Alert report priority: 0 to 15 Not available for EJX.	1. TRUE 2. 15	W
2. UDO block	2	DESCRIPTION	Indicates the version and model information of the downloaded data.	---	R
	3	STATE	Indicates the status of UAP block. 0 Idle 1 Downloading 3 Applying 4 DLComplete 6 DLError	---	R
	5	MAX_BLOCK_ SIZE	Maximum block size. This value is smaller than the maximum data size of APDU.	---	R
	14	LAST_BLOCK_ DOWNLOADED	Indicates the last downloaded block number. 0 means that no block has been downloaded.	---	R
	16	ERROR_CODE	Indicates the error codes for DLError. 0 = noError 1 = Timeout 2 = ClientAbort 64 = Apply failure	---	R
3. CO block	1	REVISION	Indicates the revision number such as COMM_ ENDPOINT, etc.	---	R
	2	COMM_ ENDPOINT	Indicates the Endpoint information. The following shows the components. 1. Network address of remote endpoint 2. Transport layer port at remote endpoint 3. Object ID at remote endpoint 4. Stale data limit 5. Data publication period 6. Ideal publication phase 7. PublishAutoRetransmit 8. Configuration status	---	W
	3	COMM_ CONTRACT	Indicates the Contract information. The following shows the components. 1. ContractID 2. Contract_Status 3. Actual_Phase	---	R

Object ID	Attribute ID	Label	Description	Default value	Handling
3. CO block (continued)	4	PUB_ITEM_MAX	Maximum PUB_ITEM value	---	R
	5	PUB_ITEM_NUM	PUB_ITEM number	---	R
	6	PUB_ITEM	Indicates the PUB_ITEM information. The following shows the components 1. ObjectID 2. AttributeID 3. AttributeIndex 4. Size	---	W
4. TRANSDUCER block	1	Tag Description	Memo field available to write anything.	Transducer	W
	2	Auto Recovery	Allows specifying the action when the cause of a sensor failure is removed. OFF (=0): AL continues to be indicated even after the cause of the sensor error is removed, and the BURN OUT state is not released. ON (=1): The AL indication for sensor failure disappears and normal action is resumed when the cause of the sensor failure is removed.	ON	W
	3	Model	Indicates the model name of the transmitter.	---	R
	4	Sensor Serial Number	Indicates the device number of the transmitter.	---	R
	5	Measurement Rate*3	Indicates the measurement period of process values.	---	R
	6	Measurement Mode	Measurement mode selects continuous mode or intermittent mode. When the update time is set to 0.5 second*4 in intermittent mode, the mode is automatically switched to continuous mode. When the update time is set to 0.5 second*4, the computation process is in continuous mode, regardless of the measurement mode. When 0 is set, measurement period is set to 30 seconds regardless of measurement setting.	intermittent mode	W
	7	Wireless Status	Indicate the communication status. 1. Indicates the initial idle status or join status. (idle status, join status) 2. Indicates whether Contract(Pub) is established. (not establishment, establishment) 3. Indicates whether Contract(R/W) is established. (not establishment, establishment)	1. idle status 2. not estabilishment 3. not esabilishment	R
	8	Display Selection	Select PV Value displaying on the LCD indicator. 1. Indicates display status of PV Value of AI1 (displayed, not displayed) 2. Indicates display status of PV Value of AI2 (displayed, not displayed) 3. Indicates display status of PV Value of AI3 (displayed, not displayed)	1. displayed 2. not displayed 3. not displayed	W
	9	LCD Mode	Select the display mode on the LCD indicator. 1. Indicates the ON mode. (off, intermittent) 2. Indicates whether continuous or not. (continuous off, continuous on)*3 3. Indicates the bar graph display. (bar graph not displayed, bar graph displayed)	1. OFF 2. continuous OFF*3 3. bar graph not displayed	W
	10	Special Cmd	Special function parameter. 0 = initialize value at READ (None) 1 = Squawk status 2 = deep sleep status To start from deep sleep mode, either remove and insert the battery pack, or use the provisioning device tool or the device configuration tool via infrared communication.	0	W

Object ID	Attribute ID	Label	Description	Default value	Handling
4. TRANSDUCER block (continued)	11	Special Order ID	Displays the special order number, if applicable.	---	R
	12	Unit Sel1	Selects whether to automatically apply the unit to the word for the parameter for which the unit display is selected, or apply the characters that are written to Display Unit1. (Auto, Custom)	Auto	W
	13	Display Unit11	When Custom is selected in Unit Sel1, set the display unit using 6 characters or less.	NULL	W
	14	LCD Intermittetnt Time*2	Set the time to turn off display on the LCD indicator. When 0 is set, it is diplayed in continuous mode. Unit: second	60 seconds	W
	15	XD Filter*2	Set the damping time to Tranceducer value in the AI1 ans AI2 blocks. Unit: second When Measurement mode is set to continuous mode, it is valid.	2 seconds	W
	16	Measurement Rate*2	Indicates the cycle to publish the measurement value and status	0	R
5. AI1 block	1	Process Value	AL1 is a pressure output object. Indicates the primary analog value (or corresponding process value) and status used to execute this function. Allows updating data by specifying this for the Concentrator object. 1. Value: output value of AI object 2. Status: Specify output status of AI object.	1. Value = --- 2. Status = ---	W
	2	Block Mode	A universal parameter to indicate the block's operation status. Each O/S, Auto, and Man can select from. 1. Target : Specify AI object mode. 2. Actual : Indicates current mode of AI object. 3. Permitted : Indicates the mode selected by Target of AI object. 4. Normal : Indicate normal status mode of AI object.	1. Target=Auto 2. Actual=Auto 3. Permitted= Auto 4. Normal=Auto	W
	3	Concentrator OID	Indicates the Concentrator object value that corresponds to the data update of the PV value.	3	R
	4	Scale	Allows specifying the upper or lower limit for the PV scaling, unit code, etc. 1. EU at 100% : Indicate the upper limit of the PV value. 2. EU at 0% : Indicate the lower limit of the PV value. 3. Units Index : Indicate the setting unit used for the PV value. 4. Decimal : Indicate the digit number below the decimal point displayed in the LCD indicator.	1. EU at 100% = 100 2. EU at 0% = 0 3. Units Index = % 4. Decimal = 2	W
	26	Tag Description	A universal parameter to store the comment that describes the tag	AI1: Differential Pressure	W
	27	Process Value Filter Time	Allows adjusting the time constant for filtering the PV value. Setting unit: Second. This is enabled for the Continuous mode.*5	0 second	W
	28	Simulate Switch	A simulation function switch for the AI object test (Disable, Enable)	1 (Disable)	W
	29	Transducer Value	When Simulate Switch is set to Disable, this value is used as the input value for the AI object. Refer to Figure 10.1.	Disable	R
	30	Simulate Value	When Simulate Switch is set to Enable, this value is used as the input value for the AI object. The input value can be changed.	---	W
	51	Upper Limit	Indicates the upper limit (URL) for the pressure.	---	R

Object ID	Attribute ID	Label	Description	Default value	Handling
5. AI1 block (continued)	52	Lower Limit	Indicates the lower limit (LRL) for the pressure.	---	R
	53	PV Range	Sets the measurement range. 1. EU at 100% : Indicates input value of the upper limit. 2. EU at 0% : Indicates input value of the lower limit. 3. Units Index : Indicates the units of the measurement range. 4. Decimal : Indicates the digit number below the decimal point.	EU at 100% = 100 EU at 0% = 0 Units Index = kPa (1133) Decimal = 2	W
	54	Linearization Type	Select either No Linearization or Square root as a setting of the output range. 0 = No Linearization : Provides an output value scaled according to the PV Range and Scale range settings. (To use Direct with FF, set the same value for PV Range and Scale.) 10 = Square root : Provides a square root output computed for the value scaled according to the PV Range and Scale range settings.	0	W
	55	Flow Constant	Indicates the flow coefficient, which shows the correlation between the flow rate value and square root value of the differential pressure.	1.0	W
	56	Lower Cutoff	Specifies the low cut value. The unit is subject to Scale.Units Index.	10	W
	57	Cal Cmd	Specifies the calibration method. 0 = CAL_NONE : Initial state in which calibration is not performed 1 = CAL_LOW : Applies an actual input and adjusts the lower limit using the value specified in Calibration Lowest Point. 2 = CAL_HIGH : Applies an actual input and adjusts the higher limit using the value specified in Calibration Highest Point. 5 = CAL_CLEAR : Clears the adjustment variable.	0 (reading value is always 0)	W
	58	Cal Status	Indicates the calibration status. 0 = CAL_NONE : Start-up and default value 1 = CAL_SUCCESS : Indicates that calibration was successful. 7 = CAL_BAD_TRIM_POINT : Indicates this status when the adjustment variable is outside of range.	---	R
	59	Calibration Highest Point	Specifies the higher limit adjustment variable for adjustment between two points.	---	W
	60	Calibration Lowest Point	Specifies the lower limit adjustment variable for the adjustment between two points.	---	W
	61	Calibration Minimum Span	Indicates the minimum span of the adjustment variable.	---	R
	104	External Zero Trim	Allows performing external zero adjustment. (Trim on, Trim off)	Trim on	W
	105	Low Cut Mode	Specifies the low cut mode. (Linear, Zero)	Linear	W
	106	H/L Swap	Allows performing reverse connection of the impulse line. (NORMAL, REVERSE : reverse connection) Used when the lower pressure side and higher pressure side of the impulse line were connected wrongly when installing the pressure transmitter.	Normal	W

Object ID	Attribute ID	Label	Description	Default value	Handling
5. AI1 block (continued)	107	T Zero Cmp	Parameter to select the temperature zero shift compensation mode 0 = OFF : Does not perform temperature zero shift compensation. 1 = ON : Performs temperature zero shift compensation.	Off	w
	108	Temp Zero	Parameter to set the temperature gradient value for the temperature zero shift compensation	0	w
	109	Temp Select	Parameter to select the temperature (amplifier-side / capsule-side) used for the temperature zero shift compensation. 0 = AMP TEMP : the value of the amplifier-side temperature sensor is used. 1 = CAP TEMP : the value of the capsule-side temperature sensor is used.	1	w
6. AI2 block	1	Process Value	AI2 is a static pressure output object. Indicates the primary analog value (or corresponding process value) and status used to execute this function. Allows updating data by specifying this for the Concentrator object. 1. Value: output value of AI object 2. Status: Specify output status of AI object.	---	W
	2	Block Mode	A universal parameter to indicate the block's operation status. O/S, Auto, and Man can be selected. 1. Target : Specify AI object mode. 2. Actual : Indicates current mode of AI object. 3. Permitted : Indicates the mode selected by Target of AI object. 4. Normal : Indicate normal status mode of AI object.	1.Target = O/S 2.Actual = O/S 3.Permitted = O/S 4.Normal = O/S	W
	3	Concentrator OID	Indicates the Concentrator object value that corresponds to the data update of the PV value.	3	R
	4	Scale	Allows specifying the upper or lower limit for the PV scaling, unit code, etc. 1. EU at 100% : Indicate the upper limit of the PV value. 2. EU at 0% : Indicate the lower limit of the PV value. 3. Units Index : Indicate the setting unit used for the PV value. 4. Decimal : Indicate the digit number below the decimal point displayed in the LCD indicator.	1. EU at 100% = 100 2. EU at 0% = 0 3. Units Index = % 4. Decimal = 2	W
	26	Tag Description	A universal parameter to store the comment that describes the tag.	AI2: Static Pressure	W
	27	Process Value Filter Time	Allows adjusting the time constant for filtering the PV value. Setting unit: Second. This is enabled for the Continuous mode.	0 second	W
	28	Simulate Switch	A simulation function switch for the AI object test (Disable, Enable)	Disable	W
	29	Transducer Value	When Simulate Switch is set to Disable, this value is used as the input value for the AI object.	---	R
	30	Simulate Value	When Simulate Switch is set to Enable, this value is used as the input value for the AI object. The input value can be changed.	---	W
	51	Upper Limit	Indicates the upper limit (URL) for the pressure.	---	R
	52	Lower Limit	Indicates the lower limit (LRL) for the pressure.	---	R

Object ID	Attribute ID	Label	Description	Default value	Handling
6. AI2 block (continued)	53	PV Range	Sets the measurement range. 1. EU at 100% : Indicates input value of the upper limit. 2. EU at 0% : Indicates input value of the lower limit. 3. Units Index : Indicates the units of the measurement range. 4. Decimal : Indicates the digit number below the decimal point.	1. EU at 100% = 25000.000000 EU at 0% = 0 Units Index = kPa Decimal = 2	W
	54	Linearization Type	Select either No Linearization or Square root as a setting of the output range. 0 = No Linearization : Provides an output value scaled according to the PV Range and Scale range settings. (To use Direct with FF, set the same value for PV Range and Scale.)	0	W
	55	Flow Constant	Indicates the flow coefficient, which shows the correlation between the flow rate value and square root value of the pressure.	1.0	W
	56	Lower Cutoff	Specifies the low cut value. The unit is subject to Scale.Units Index.	10	W
	57	Cal Cmd	Specifies the calibration method. 0 = CAL_NONE : Initial state in which calibration is not performed 1 = CAL_LOW : Applies an actual input and adjusts the lower limit using the value specified in Calibration Lowest Point. 2 = CAL_HIGH : Applies an actual input and adjusts the higher limit using the value specified in Calibration Highest Point. 5 = CAL_CLEAR : Clears the adjustment variable.	0 (reading value is always 0)	W
	58	Cal Status	Indicates the calibration status. 0 = CAL_NONE : Start-up and default value 1 = CAL_SUCCESS : Indicates that calibration was successful. 7 = CAL_BAD_TRIM_POINT : Indicates this status when the adjustment variable is outside of range.		R
	59	Calibration Highest Point	Specifies the higher limit adjustment variable for adjustment between two points.	---	W
	60	Calibration Lowest Point	Specifies the lower limit adjustment variable for the adjustment between two points.	---	W
	61	Calibration Minimum Span	Indicates the minimum span of the adjustment variable. 108 = Gauge pressure 109 = Absolute pressure	---	R
	102	Static Process Type	Selects the gauge pressure or the absolute pressure.	Abs	W
	103	SP Select	Parameter to select the High-side pressure or the Low-side pressure as the static pressure output. 0 = High : Displays the H-side pressure as the static pressure 1 = Low : Displays the L-side pressure as the static pressure	High	W
7. AI3 block	1	Process Value	AI3 is a temperature pressure output object. Indicates the primary analog value (or corresponding process value) and status used to execute this function. Allows updating data by specifying this for the Concentrator object. 1. Value: output value of AI object 2. Status: Specify output status of AI object.	1. Value = --- 2. Status = ---	W

Object ID	Attribute ID	Label	Description	Default value	Handling
7. AI3 block (continued)	2	Block Mode	A universal parameter to indicate the block's operation status. O/S, Auto, and Man can be selected. 1. Target : Specify AI object mode. 2. Actual : Indicates current mode of AI object. 3. Permitted : Indicates the mode selected by Target of AI object. 4. Normal : Indicate normal status mode of AI object.	1. Target = Auto 2. Actual = Auto 3. Permitted = O/S+Auto +Man 4. Normal = Auto	W
	3	Concentrator OID	Indicates the Concentrator object value that corresponds to the data update of the PV value.	3	R
	4	Scale	Allows specifying the upper or lower limit for the PV scaling, unit code, etc. 1. EU at 100% : Indicate the upper limit of the PV value. 2. EU at 0% : Indicate the lower limit of the PV value. 3. Units Index : Indicate the setting unit used for the PV value. 4. Decimal : Indicate the digit number below the decimal point displayed in the LCD indicator.	1. EU at 100% = 100 2. EU at 0% = 0 3. Units Index = % 4. Decimal = 2	W
	26	Tag Description	A universal parameter to store the comment that describes the tag	AI3: Capsule temperature	W
	27	Process Value Filter Time	Allows adjusting the time constant for filtering the PV value. Setting unit: Second. This is enabled for the Continuous mode.	0 second	W
	28	Simulate Switch	A simulation function switch for the AI object test (Disable, Enable)	Disable	W
	29	Transducer Value	When Simulate Switch is set to Disable, this value is used as the input value for the AI object.	---	R
	30	Simulate Value	When Simulate Switch is set to Enable, this value is used as the input value for the AI object. The input value can be changed.	---	W
	53	Sensor Range	Parameter to nondimensionalize the sensor output value. K and deg C are selectable for the temperature unit. 1. EU at 100% : Indicates input value of the upper limit. 2. EU at 0% : Indicates input value of the lower limit. 3. Units Index : Indicates the units of the measurement range. 4. Decimal : Indicates the digit number below the decimal point.	1. EU at 100% = 130 2. EU at 0% = -50 3. Units Index = deg C 4. Decimal = 0	W
	102	Tertiary Value Select	Specifies either the capsule temperature or amplifier temperature as the output value. (CAP, AMP)	CAP	W

(Note) Handling: R=Read only, W=Read & Write
(Note) "Factory NAMUR category" refers to the four categories (C: Check function, M: Maintenance required, F: Failure, and O: Off specification) according to NAMUR NE107*.

*1: NAMUR NE107 "Self-Monitoring and Diagnosis of Field Devices"
*2: Applicable for Detachable antenna type (Amplifier housing code: 8 or 9).
*3: Applicable for amplifier housing code 7.
*4: Applicable for amplifier housing code 8 or 9.
*5: Minimum value is 1 second, when amplifier housing code 7 is specified.
*6: It is valid for not only continuous mode but also intermittent mode, when amplifier housing code 8 or 9 is specified.

Table 9.2 Diagnostic Status Detail[0]

Bit	Diagnostic Status Detail	Description	Diagnostic Status assignment bit	NAMUR
DiagnosticDetail_1				
31	FC_SENSOR_FAIL	C sensor frequency error	Bit26	F
30	FR_SENSOR_FAIL	R sensor frequency error	Bit26	F
29	CAP_T_SENSOR_FAIL	Capsule temperature sensor failure	Bit26	F
28	CAP_EEPROM_FAIL	Capsule EEPROM failure	Bit26	F
27	CAP_EEP_IRREGULAR	CAP EEPROM version not correct	Bit26	F
26	AMP_T_SENSOR_FAIL	Amplifier temperature sensor failure	Bit27	F
25	AMP_EEPROM_FAIL	Amplifier EEPROM failure	Bit27	F
24	AMP_EEP_IRREGULAR	AMP EEPROM version not correct	Bit27	F
22	G_A_COMM_FAIL	G/A failure	Bit27	F
21	FC_UNOSC_FAIL	C sensor oscillation stop failure	Bit26	F
20	FC_DELTA_T_FAIL	C-side deltaT circuit failure	Bit27	F
19	FR_DELTA_T_FAIL	R-side deltaT circuit failure	Bit27	F
18	WL_AD_FAIL	Battery voltage not detected (AMP failure)	Bit27	F
17	FR_UNOSC_FAIL	R sensor oscillation stop failure	Bit26	F
15	DP_OUTSIDE_LIMIT	Pressure outside of specified range	Bit23	O
14	SP_OUTSIDE_LIMIT	Static pressure outside of specified range	Bit23	O
13	CAPT_OUTSIDE_LIMIT	Capsule temperature outside of specified range	Bit23	O
12	AMPT_OUTSIDE_LIMIT	Amplifier temperature outside of specified range	Bit23	O
7	DP_OUTSIDE_RANGE	Input pressure setting outside of range	Bit22	O
6	SP_OUTSIDE_RANGE	Static pressure setting outside of range	Bit22	O
DiagnosticDetail_2				
31	AI1_OUT_OF_SERVICE	AI1 O/S mode	Bit24	C
30	AI2_OUT_OF_SERVICE	AI2 O/S mode	Bit24	C
29	AI3_OUT_OF_SERVICE	AI3 O/S mode	Bit24	C
28	AI1_SIMULATION_ACTIVE	AI1 simulation mode	Bit17	C
27	AI2_SIMULATION_ACTIVE	AI2 simulation mode	Bit17	C
26	AI3_SIMULATION_ACTIVE	AI3 simulation mode	Bit17	C
20	DP_TRIM_SPAN_OUTSIDE	Pressure span adjustment variable outside of range	Bit25	C
19	DP_TRIM_ZERO_OUTSIDE	Pressure zero adjustment variable outside of range	Bit25	C
15	SP_TRIM_SPAN_OUTSIDE	Static pressure span adjustment variable outside of range	Bit25	C
14	SP_TRIM_ZERO_OUTSIDE	Static pressure zero adjustment variable outside of range	Bit25	C
13	WL_LOWBAT_ALM	Low battery	Bit19	M
12	CRITICAL_LOWBAT*1	Detect a decrease in the lowest drive voltage.	Bit20	M
10	WL_DEEPSLP_ALM	Deep sleep due to low battery	Bit20	M
8	LCD_OUTSIDE_LIMIT	LCD display outside of specified range	Bit25	C

*1: Applicable for amplifier housing code 8 or 9.
*2: Applicable for amplifier housing code 7.

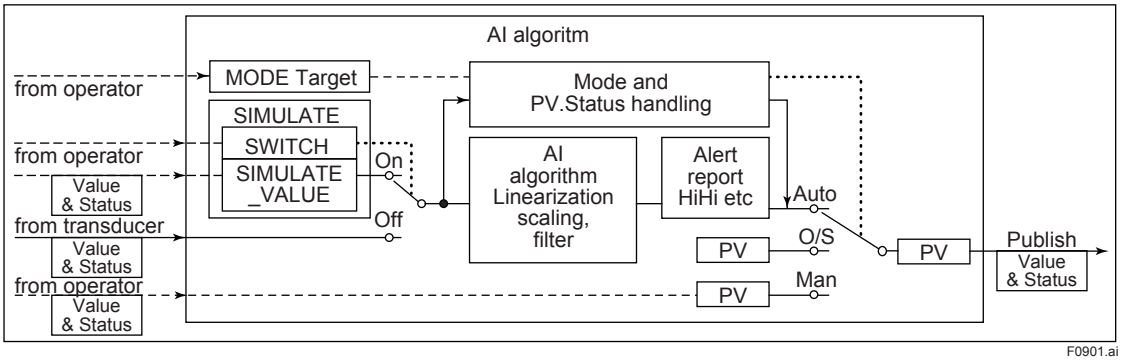


Figure 9.1 Example schema of analog input object

10. General Specifications

10.1 Standard Specifications

Communication protocol

ISA100.11a protocol

Data rate

250 kbps

Frequency

2400 - 2483.5 MHz license free ISM band

Radio security

AES 128 bit codified

RF Transmitter power

Max. 11.6 dBm (fixed)

Antenna

+2 dBi Omni directional monopole type

Span and range limits

EJX118B

Measurement Span/Range		kPa	inH_2O(/D1)	mbar(/D3)	mmH_2O(/D4)
M	Span	2 to 100	8 to 400	20 to 1000	200 to 10000
	Range	–100 to 100	–400 to 400	–1000 to 1000	–10000 to 10000
H	Span	10 to 500	40 to 2000	100 to 5000	0.1 to 5 kgf/cm^2
	Range	–500 to 500	–2000 to 2000	–5000 to 5000	–5 to 5 kgf/cm^2

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Measurement Span and Range			MPa	psi (/D1)	bar (/D2)	kgf/cm^2 (/D3)
A*1		Span	0.035 to 3.5	5 to 500	0.35 to 35	0.35 to 35
		Range	–0.1 to 3.5	–14.5 to 500	–1 to 35	–1 to 35
B	Flush type*1	Span	0.16 to 16	23 to 2300	1.6 to 160	1.6 to 160
		Range	–0.1 to 16	–14.5 to 2300	–1 to 160	–1 to 160
	Extended type*1	Span	0.16 to 7	23 to 1000	1.6 to 70	1.6 to 70
		Range	–0.1 to 7	–14.5 to 1000	–1 to 70	–1 to 70

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*1: Measurement range is within the flange rating.

Performance specifications

Refer to GS01C27H01-01EN

Update Time

Measurement mode	Differential pressure	Pressure
Continuous	100 ms	100 ms
Intermittent	0.5 to 3600 s selectable	0.5 to 3600 s selectable

For amplifier housing code 7:
The transmitter shifts to the countinuous mode when the update time is set to 1 second.
Minimum update time is 1 second.
For amplifier housing code 8 and 9:
The transmitter shifts to the countinuous mode when the update time is set to 0.5 second.

Power Supply Specifications

Battery:
Use the dedicated battery pack.
Rated voltage: 7.2 V
Rated capacity: 19 Ah

Output

Wireless (ISA100.11a protocol) 2.4 GHz signal.
Output mode for EJX118B, linear or square root, is selectable.

Zero Adjustment Limits

Zero can be fully elevated or suppressed, within the lower and upper range limits of the capsule.

External Zero Adjustment

External Zero is continuously adjustable with 0.01% incremental resolution of span. Re-range can be done locally using the digital indicator with range-setting switch.

Integral Indicator (LCD display)

5-digit numerical display, 6-digit unit display and bar graph.
The indicator is configurable to display one or up to three of the following variables periodically.; Differential pressure, static pressure, temperature.

Self Diagnostics

Capsule failure, amplifier failure, configuration error, battery alarm, wireless communication alarm and over-range error for process variables.

Capillary Fill Fluid Density Compensation

Compensation of the zero shift by the ambient temperature effect on the capillary tube.

Ambient Temperature Limits

-40 to 85°C (-40 to 185°F)
-30 to 80°C (-22 to 176°F) LCD visible range

Note: The ambient temperature limits must be within the fill fluid operating temperature range, see table 10.1.

Process Temperature Limits

See table 10.1.

Ambient Humidity Limits

0 to 100% RH

Working Pressure Limits

See table 10.1.

For atmospheric pressure or below, see figure 10.1 and 10.2.

Table 10.1 Process temperature, Ambient temperature, and Working pressure

	Code	Process temperature*1	Ambient temperature*2	Working pressure	Specific gravity*3
Silicone oil (general use)	A	–10 to 250°C *4 (14 to 482°F)	–10 to 60°C (14 to 140°F)	2.7 kPa abs (0.38 psi abs) to flange rating pressure	1.07
Silicone oil (general use)	B	–30 to 180°C (–22 to 356°F)	–15 to 60°C (5 to 140°F)		0.94
Silicone oil (high temperature use)	C	10 to 310°C (50 to 590°F)	10 to 60°C (50 to 140°F)		1.09
Fluorinated oil (oil-prohibited use)	D	–20 to 120°C (–4 to 248°F)	–10 to 60°C (14 to 140°F)	51 kPa abs (7.4 psi abs) to flange rating pressure	1.90 to 1.92
Ethylene glycol (low temperature use)	E	–50 to 100°C (–58 to 212°F)	–40 to 60°C (–40 to 140°F)	100 kPa abs (atmospheric pressure) to flange pressure rating	1.90

T06E.ai

*1: See figure 10-1 and 10-2 'Working Pressure and Process Temperature.
*2: This ambient temperature is the transmitter ambient temperature.
*3: Approximate values at a temperature of 25°C (77°F)
*4: In case of wetted parts material code TW (Tantalum), process temperature limit is up to 200°C (392°F).

Note: The differential pressure transmitter should be installed at least 600 mm below the high pressure (HP) process connection. However, this value (600 mm) may be affected by ambient temperature, operating pressure, fill fluid or material of the wetted diaphragm. Contact YOKOGAWA when the transmitter can not be installed at least 600 mm below the HP process connection..

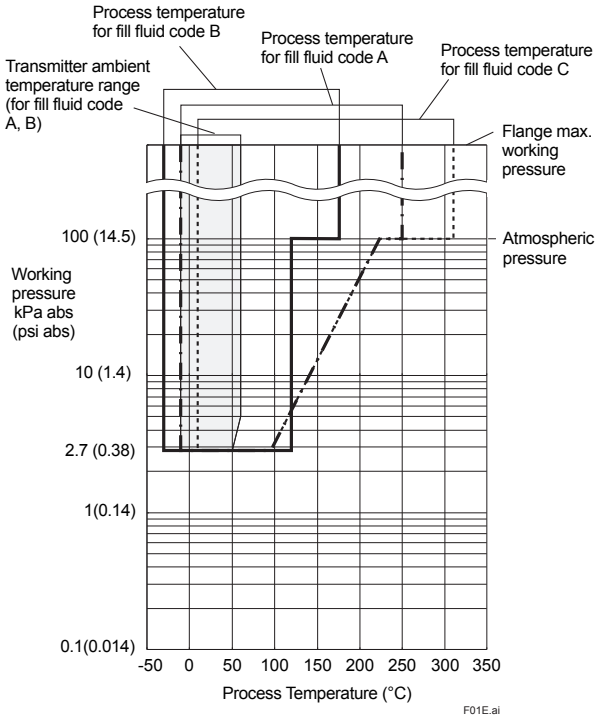

Process temperature for fill fluid code B
Process temperature for fill fluid code A
Process temperature for fill fluid code C
Transmitter ambient temperature range (for fill fluid code A, B)
Flange max. working pressure
Atmospheric pressure
100 (14.5)
Working pressure kPa abs (psi abs)
10 (1.4)
2.7 (0.38)
1(0.14)
0.1(0.014)
-50 0 50 100 150 200 250 300 350
Process Temperature (°C)
F01E.ai

Figure 10.1 Working Pressure and Process Temperature (Fill fluid : silicone oil for general and high temperature use)

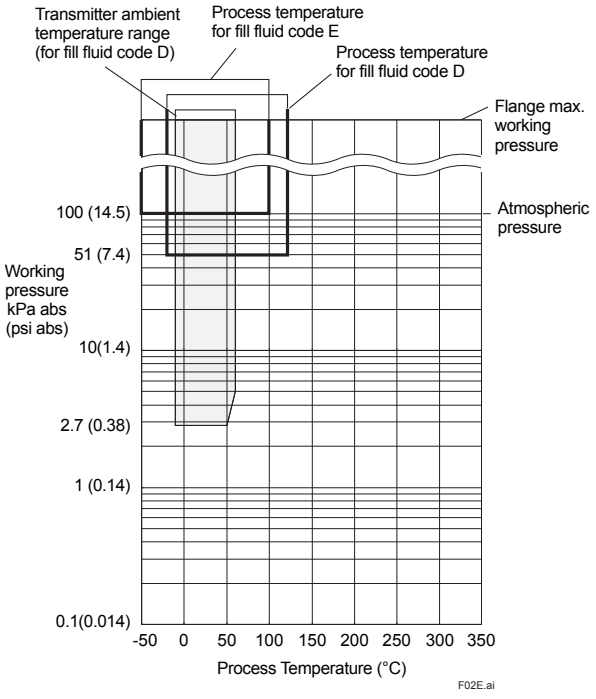


Figure 10.2 Working Pressure and Process Temperature (Fill fluid : fluorinated oil for oil-prohibited use and ethylene glycol for low temperature use)

EMC Conformity Standards

EN61326-1 Class A, Table 2 (For use in industrial locations), EN61326-2-3

R&TTE Conformity Standards CE

ETSI EN 300 328, ETSI EN 301 489-17, EN61010-1, EN62311

• Indoor/Outdoor use

AT	BE	BG	CY	CZ	DK
EE	FI	FR	DE	GR	HU
IE	IT	LV	LT	LU	MT
NL	PL	PT	RO	SK	SI
ES	SE	GB	IS	LI	NO
CH					

Regulation Conformity of the Wireless Module

• FCC Approval
• IC Approval

Safety Requirement Standards

EN61010-1

• Altitude of installation site:
Max. 2,000 m above sea level
• Installation category: I
• Pollution degree: 2
• Indoor/Outdoor use

Process connections

See the following table.

Table 10.2 Flange size and rating

Process connection style	Size	Flange
Flush type	3-inch 2-inch $1^{1/2}$-inch*1	JIS 10K, 20K, 40K, 63K*2 ANSI Class 150, 300, 600 JPI Class 150, 300, 600 DIN PN10/16, 25/40, 64
Extended type	4-inch 3-inch	JIS 10K, 20K, 40K*2 ANSI Class 150, 300 JPI Class 150, 300 DIN PN10/16, 25/40
Combination type (Extended and Flush)*3	High pressure side: 4-inch Low pressure side: 3-inch	JIS 10K, 20K ANSI Class 150, 300 JPI Class 150, 300 DIN PN10/16, 25/40

T07E.ai

*1: Flushing connection rings are always attached.
*2: Applicable for EJX438B only.
*3: Applicable for EJX118B only.

Gasket Contact Surface

See the following table.

Table 10.3 Gasket contact surface

Flange		JIS/JPI/DIN		ANSI	
Wetted parts material code		SW, SE, SY	HW, TW, UW	SW, SE, SY	HW, TW, UW
Gasket contact Surface	Serration*1	—	—	●	—
	Flat (No serration)	●	●	●	●

T08E.ai

●: Applicable, —: Not applicable
*1: ANSI B16.5

Electrical Connections

See “MODEL AND SPECIFICATIONS.”

Transmitter Mounting

2-inch pipe mounting

Wetted Parts Material

Diaphragm seal

Diaphragm and other wetted parts;

Refer to “Model And Suffix Codes.”

Flushing connection ring (optional)

Ring and Vent / Drain plugs

Refer to “Model And Suffix Codes.”

(Spiral) gasket for transmitter side
316 SST (Hoop), PTFE Teflon (Filler)

Non-wetted Parts Material

Transmitter body section:

Cover flange

ASTM CF-8M

Cover flange bolting

ASTM-B7 carbon steel, 316L SST stainless steel, or ASTM grade 660 stainless steel

Housing

Low copper cast aluminum alloy with polyurethane, mint-green paint (Munsell 5.6BG 3.3/2.9 or its equivalent)

Degrees of Protection

IP66/IP67, NEMA4X

Name plate and tag

316 SST tag plate wired onto transmitter

Diaphragm seal section:

Process Flange

JIS S25C, JIS SUS304, or JIS SUS316

Capillary tube

316 SST

Protection tube

304 SST PVC-sheathed
(Max. operating temperature of PVC,100°C (212°F))

Fill fluid

See table 10.1.

Weight

EJX118B

Flush type: 18.2 kg (40.1 lbs)
(3-inch ANSI Class150 flange, capillary length 5 m; without integral indicator and mounting bracket.)
Extended type: 23.8 kg (52.5 lbs)
(4-inch ANSI Class150 flange, extension length (X_2)=100 mm, capillary length 5 m; without integral indicator and mounting bracket.)
Combination type: 21.0 kg (46.3 lbs)
(4-inch and 3-inch ANSI Class150 flange, extension length (X_2) =100 mm, capillary length 5 m; without integral indicator and mounting bracket.)

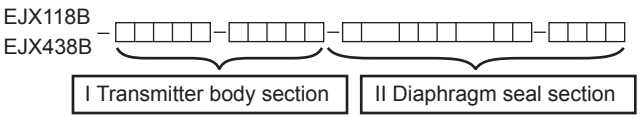
EJX438B

Flush type: 9.2 kg (20.3 lbs)
(3-inch ANSI Class 150 flange, capillary length 5 m; without integral indicator and mounting bracket.)
Extended type: 14.3 kg (31.5 lbs)
(4-inch ANSI Class 150 flange, extension length (X_2)=100 mm, capillary length 5 m; without integral indicator and mounting bracket.)

10.2 Model and Suffix Codes

● Instruction

The model and suffix codes for EJX118B and EJX438B consist of two parts; a transmitter body section (I) and a diaphragm seal section (II). This specification sheet introduces these two parts separately. The transmitter body section is shown in one table, and the diaphragm seal section specifications are listed according to the process connection style. First select the model and suffix codes of transmitter body section and then continue on one of the diaphragm seal section.



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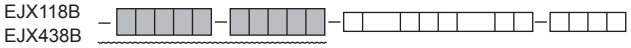
I. Transmitter body section



Model	Suffix codes	Description
EJX118B	. . . . .	Diaphragm sealed differential pressure transmitter
EJX438B	. . . . .	Diaphragm sealed Gauge Pressure transmitter
Output signal	- **L**	Wireless communication (ISA100.11a protocol)
Measurement span (capsule)	**M***2	2 to 100 kPa (8 to 400 inH_2O)
	H*2	10 to 500 kPa (40 to 200 inH_2O)
	A*3	0.035 to 3.5 MPa (5 to 500 psi)
	B*3	0. 16 to 16 MPa (23 to 2300 psi)*1
—	**S**	Always S
—	**C**	Always C
Coverflange bolts and nuts material	**J**	ASTM-B7 carbon steel
	G	316L SST stainless steel
	C	ASTM grade660 stainless steel
Installation	**-9**	Horizontal piping type and left side high pressure
Amplifier housing	**7**	Cast aluminum alloy with integral antenna
	8	Cast aluminum alloy with detachable antenna (2 dBi)*5
	9	Cast aluminum alloy without antenna (N connector)*4*5
Electrical connection	**J**	No electrical connection, battery-powered type (battery case only; battery cells not included)
Integral Indicator	**D**	Digital indicator
Mounting braket	**B**	304 SST 2-inch pipe mounting, flat type (for horizontal piping)
►	**N**	None
Diaphragm seal section		– Continued on diaphragm seal section (II)

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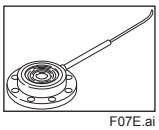
The "►" marks indicate the most typical selection for each specification.
*1: When specified process connection style code E, maximum range and span are 7 MPa (1000 psi.)
*2: Applicable for EJX118B
*3: Applicable for EJX438B
*4: Order the antenna separately from accessary option.
*5: Remote antenna cables can be attached. Order separately from accessary option.

II. Diaphragm seal section (Flush type)

● Process connection size: 3-inch (80 mm) / 2-inch (50 mm)

EJX118B
EJX438B – □□□□□ – □□□□□ – W ■ (3/2) ■■■■■ – ■■■■



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Model	Suffix codes	Description	EJX118B	EJX438B
EJX118B **EJX438B**	– □□□□□ – □□□□□	Transmitter body section (I)		
Process connection style	**-W**	Flush type		
Flange rating	**J1**	JIS 10K	○	○
	J2	JIS 20K	○	○
	J4	JIS 40K	○	○
	J6	JIS 63K	–	○
	A1	ANSI class 150 / **P1** JPI class 150	○	○
	A2	ANSI class 300 / **P2** JPI class 300	○	○
	A4	ANSI class 600 / **P4** JPI class 600	○	○
	D2	DIN PN10/16	○	○
	D4	DIN PN25/40	○	○
	D5	DIN PN64	○	○
Process connection size (Process flange size)	**3**	3-inch (80 mm)	○	○
	2	2-inch (50 mm)	○	○
Flange material	**A**	JIS S25C	○	○
	► **B**	JIS SUS304	○	○
	C	JIS SUS316	○	○
Gasket contact surface *1	**1**	Serration (for ANSI flange with wetted parts material SW only)	○	○
	2	Flat (no serration)	○	○
Wetted parts material*10		[Diaphragm] / [Others]		
	SW	JIS SUS316L / JIS SUS316L	○	○
	HW	Hastelloy C-276 *9# / Hastelloy C-276 *9#	○	○
	TW	Tantalum*7 / Tantalum*7	○	○
	UW	Titanium / Titanium	○	○
Flushing connection ring*2		[Ring] / [Drain/Vent plugs] / [Material]		
	► **0**	None / — / —	○	○
	1	Straight type / R 1/4 connections*8 / JIS SUS316 #	○	–
	2	Straight type / 1/4 NPT connections / JIS SUS316 #	○	–
	A	Straight type / R 1/4 connections*8 / JIS SUS316 #	–	○
	B	Straight type / 1/4 NPT connections / JIS SUS316 #	–	○
Extension	**0**	None	○	○
Fill fluid		[Process temp.] [Ambient temp.]		
	-A	For general use (silicone oil)*3 –10 to 250°C –10 to 60°C	○	○
	► **-B**	For general use (silicone oil) –30 to 180°C –15 to 60°C	○	○
	-C	For high temperature use (silicone oil)*4 *7 10 to 310°C 10 to 60°C	○	○
	-D	For oil-prohibited use (fluorinated oil)*5 –20 to 120°C –10 to 60°C	○	○
	-E	For low temperature use (ethylene glycol) –50 to 100°C –40 to 60°C	○	○
Capillary connection	**A**	Side of diaphragm seal unit	○	○
—	**2**	Always 2	○	○
Capillary length*6	**1**	1 m	○	○
	2	2 m	○	○
	3	3 m	○	○
	4	4 m	○	○
	5	5 m	○	○
	6	6 m	○	○
	7	7 m	○	○
	8	8 m	○	○
	9	9 m	○	○
	A	10 m	○	○
Option codes		/□ Optional specification		

T10E.ai

The "►" marks indicate the most typical selection for each specification. Example: EJX118B-LMSCG-97JDN-WA13B1SW00-BA25/□
EJX438B-LASCG-97JDN-WA13B1SW00-BA25/□

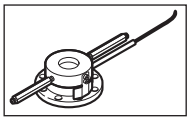
*1: See table 10-3 'Gasket contact surface.'
*2: When specified flushing connection ring code 1, 2, A, or B, exclusive gasket is provided for transmitter side.
*3: In case of wetted parts material code TW (Tantalum), the process temperature limit is –10 to 200°C.
*4: Wetted parts material code TW (Tantalum) cannot be applied.
*5: Even in case where fill fluid code D (fluorinated oil) is selected, if degrease cleansing treatment or both degrease cleansing and dehydrating treatment for the wetted parts is required, specify option code K1 or K5.

*6: In case of wetted parts material code HW (Hastelloy C), TW (Tantalum), and UW (Titanium) for 2-inch pressure flange, specify capillary length from 1 to 5 m.
*7: Not applicable for flashing connection ring code 1 and 2.
*8: Not applicable for gasket contact surface code 1.
*9: Hastelloy C-276 or N10276.
*10: Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also possible that the diaphragm itself can be damaged and that material from the broken diaphragm and the fill fluid can contaminate the user's process fluids.
Be very careful with highly corrosive process fluids such as hydrochloric acid, sulfuric acid, hydrogen sulfide, sodium hypochlorite, and high-temperature steam (150˚C [302˚F] or above). Contact Yokogawa for detailed information of the wetted parts material.
The '#'marks indicate the construction materials conform to NACE material recommendations per MR01-75. For the use of 316 SST material, there may be certain limitations for pressure and temperature. Please refer to NACE standards for details

II. Diaphragm seal section (Flush type)

● Process connection size: 1 1/2-inch (40 mm)

EJX118B
EJX438B – □□□□□–□□□□□– W ■ 8 ■■■■■–■■■■



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Model	Suffix codes	Description	EJX118B	EJX438B
EJX118B EJX438B	–□□□□□–□□□□□	Transmitter body section (I)		
Process connection style	**-W**	Flush type		
Flange rating	**J1**	JIS 10K	○	○
	J2	JIS 20K	○	○
	J4	JIS 40K	○	○
	A1	ANSI class 150	○	○
	A2	ANSI class 300	○	○
	A4	ANSI class 600	○	○
	P1	JPI class 150	○	○
	P2	JPI class 300	○	○
	P4	JPI class 600	○	○
Process connection size (Process flange size)	**8**	1 1/2-inch (40 mm)	○	○
Flange material	**A**	JIS S25C	○	○
	► **B**	JIS SUS304	○	○
	C	JIS SUS316	○	○
Gasket contact surface*1	**1**	Serration (for ANSI flange only)	○	○
	2	Flat (no serration)	○	○
Wetted parts material*5	**SW**	[Diaphragm] JIS SUS316L / [Others] JIS SUS316L	○	○
Flushing connection ring*2	**3**	[Ring] Reducer type / [Drain/Vent plugs] R 1/4 connections*4 / [Material] JIS SUS316 #	○	–
	4	Reducer type / 1/4 NPT connections / JIS SUS316 #	○	–
	C	Reducer type / R 1/4 connections*4 / JIS SUS316 #	–	○
	D	Reducer type / 1/4 NPT connections / JIS SUS316 #	–	○
Extension	**0**	None	○	○
Fill fluid		[Process temp.] [Ambient tempe.]		
	-A	For general use (silicone oil) –10 to 250°C –10 to 60°C	○	○
	► **-B**	For general use (silicone oil) –30 to 180°C –15 to 60°C	○	○
	-D	For oil-prohibited use (fluorinated oil)*3 –20 to 120°C –10 to 60°C	○	○
	-E	For low temperature use (ethylene glycol) –50 to 100°C –40 to 60°C	○	○
Capillary connection	**A**	Side of diaphragm seal unit	○	○
—	**2**	Always 2	○	○
Capillary length	**1**	1 m	○	○
	2	2 m	○	○
	3	3 m	○	○
	4	4 m	○	○
	5	5 m	○	○
	6	6 m	○	○
	7	7 m	○	○
	8	8 m	○	○
	9	9 m	○	○
	A	10 m	○	○
Option codes		/□ Optional specification		

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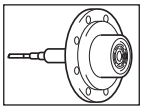
The "►" marks indicate the most typical selection for each specification. Example: EJX118B-LMSCG-97JDN-WA18B1SW40-BA25/□
EJX438B-LASCG-97JDN-WA18B1SWD0-BA25/□

*1: See table 10-3 'Gasket contact surface.'
*2: When specified flushing connection ring code 3, 4, C, or D, exclusive gasket is provided for transmitter side.
*3: Even in case where fill fluid code D (fluorinated oil) is selected, if degrease cleansing treatment or both degrease cleansing and dehydrating treatment for the wetted parts is required, specify option code K1 or K5.
*4: Not applicable for gasket contact surface code 1.
*5: Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also possible that the diaphragm itself can be damaged and that material from the broken diaphragm and the fill fluid can contaminate the user's process fluids.
Be very careful with highly corrosive process fluids such as hydrochloric acid, sulfuric acid, hydrogen sulfide, sodium hypochlorite, and high-temperature steam (150˚C [302˚F] or above). Contact Yokogawa for detailed information of the wetted parts material.

II. Diaphragm seal section (Extended type)

● Process connection size: 4-inch (100 mm) / 3-inch (80 mm)

EJX118B
EJX438B –□□□□□–□□□□□–E □ 4/3 □□□□–□□□□



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Model	Suffix codes	Description	EJX118B	EJX438B
EJX118B **EJX438B**	–□□□□□–□□□□□	Transmitter body section (I)		
Process connection style	**-E**	Extended type		
Flange rating	**J1**	JIS 10K	○	○
	J2	JIS 20K	○	○
	J4	JIS 40K	–	○
	A1	ANSI class 150	○	○
	A2	ANSI class 300	○	○
	P1	JPI class 150	○	○
	P2	JPI class 300	○	○
	D2	DIN PN10/16	○	○
	D4	DIN PN25/40	○	○
Process connection size (Process flange size)	**4**	4-inch (100 mm)	○	○
	3	3-inch (80 mm)	○	○
Flange material	**A**	JIS S25C	○	○
	► **B**	JIS SUS304	○	○
	C	JIS SUS316	○	○
Gasket contact surface*1	**1**	Serration (for ANSI flange only)	○	○
	2	Flat (no serration)	○	○
Wetted parts material*4	**SE**	[Diaphragm] JIS SUS316L / [Pipe] JIS SUS316 / [Others] JIS SUS316	○	○
Flushing connection ring	**0**	None	○	○
Extension	**1**	Length (X_2) = 50 mm	–	○
	2	Length (X_2) = 50 mm	○	–
	3	Length (X_2) = 100 mm	–	○
	4	Length (X_2) = 100 mm	○	–
	5	Length (X_2) = 150 mm	–	○
	6	Length (X_2) = 150 mm	○	–
Fill fluid		[Process temp.] [Ambient temp.]		
	-A	For general use (silicone oil) –10 to 250°C –10 to 60°C	○	○
	► **-B**	For general use (silicone oil) –30 to 180°C –15 to 60°C	○	○
	-C	For high temperature use (silicone oil) 10 to 310°C 10 to 60°C	○	○
	-D	For oil-prohibited use (fluorinated oil)*2 –20 to 120°C –10 to 60°C	○	○
	-E	For low temperature use (ethylene glycol) –50 to 100°C –40 to 60°C	○	○
Capillary connection	**B**	Back of diaphragm seal unit	○	○
—	**2**	Always 2	○	○
Capillary length*3	**1**	1 m	○	○
	2	2 m	○	○
	3	3 m	○	○
	4	4 m	○	○
	5	5 m	○	○
	6	6 m	○	○
	7	7 m	○	○
	8	8 m	○	○
	9	9 m	○	○
	A	10 m	○	○
Option codes		/□ Optional specification		

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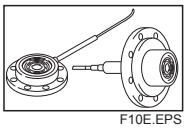
The "►" marks indicate the most typical selection for each specification. Example: EJX118B-LMSCG-97JDN-EA14B1SE02-BB25/□
EJX438B-LASCG-97JDN-EA14B1SE01-BB25/□

*1: See table 10-3 'Gasket contact surface.'
*2: Even in case where fill fluid code D (fluorinated oil) is selected, if degrease cleansing treatment or both degrease cleansing and dehydrating treatment for the wetted parts is required, specify option code K1 or K5.
*3: The specified capillary length includes the extension length (X2) and the flange thickness (t).
*4: Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also possible that the diaphragm itself can be damaged and that material from the broken diaphragm and the fill fluid can contaminate the user's process fluids.
Be very careful with highly corrosive process fluids such as hydrochloric acid, sulfuric acid, hydrogen sulfide, sodium hypochlorite, and high-temperature steam (150°C [302°F] or above). Contact Yokogawa for detailed information of the wetted parts material.

II. Diaphragm seal section (Combination type)

- **Process connection size: High pressure side; 4-inch (100 mm) • • • Extended type**
  Low pressure side; 3-inch (80 mm) • • • Flush type

EJX118B –□□□□□–□□□□□–Y □W □□□□□–□□□□



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Model	Suffix codes	Description
EJX118B	–□□□□□–□□□□□	Transmitter body section (I)
Process connection style	**-Y**	Combination type (Extended and Flush)
Flange rating	**J1**	JIS 10K
	J2	JIS 20K
	A1	ANSI class 150
	A2	ANSI class 300
	P1	JPI class 150
	P2	JPI class 300
	D2	DIN PN10/16
	D4	DIN PN25/40
Process connection size (Process flange size)	**W**	High pressure side 4-inch (100 mm) Low pressure side 3-inch (80 mm)
Flange material	**A**	JIS S25C
	► **B**	JIS SUS304
	C	JIS SUS316
Gasket contact surface *1	**1**	Serration (for ANSI flange only)
	2	Flat (no serration)
Wetted parts material *4	**SY**	[Diaphragm] [Pipe] [Others] High pressure side: JIS SUS316L JIS SUS316 JIS SUS316 Low pressure side: JIS SUS316L — JIS SUS316L
Flushing connection ring	**0**	None
Extension	**1**	Length (X2) = 50 mm
	3	Length (X2) = 100 mm
	5	Length (X2) = 150 mm
Fill fluid		[Process temperature] [Ambient temperature]
	-A	For general use (silicone oil) –10 to 250°C –10 to 60°C
	► **-B**	For general use (silicone oil) –30 to 180°C –15 to 60°C
	-C	For high temperature use (silicone oil) 10 to 310°C 10 to 60°C
	-D	For oil-prohibited use (fluorinated oil)*2 –20 to 120°C –10 to 60°C
	-E	For low temperature use (ethylene glycol) –50 to 100°C –40 to 60°C
Capillary connection	**C**	High pressure side: Back of diaphragm seal unit Low pressure side: Side of diaphragm seal unit
—	**2**	Always 2
Capillary length*3	**1**	1 m
	2	2 m
	3	3 m
	4	4 m
	5	5 m
	6	6 m
	7	7 m
	8	8 m
	9	9 m
	A	10 m
Option codes		/□ Optional specification

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The "►" marks indicate the most typical selection for each specification. Example: EJX118B-LMSCG-97JDN-YA1WB1SY01-BC25/□

*1: See table 10-3 'Gasket contact surface.'

*2: Even in case where fill fluid code D (fluorinated oil) is selected, if degrease cleansing treatment or both degrease cleansing and dehydrating treatment for the wetted parts is required, specify option code K1 or K5.

*3: The specified capillary length of high pressure side (extended side) includes the extension length (X2) and the flange thickness (t).

*4: Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also possible that the diaphragm itself can be damaged and that material from the broken diaphragm and the fill fluid can contaminate the user's process fluids.
Be very careful with highly corrosive process fluids such as hydrochloric acid, sulfuric acid, hydrogen sulfide, sodium hypochlorite, and high-temperature steam (150°C [302°F] or above). Contact Yokogawa for detailed information of the wetted parts material.

10.3 Optional Specifications

■ OPTIONAL SPECIFICATIONS (For Explosion Protected type)

Item	Description	Code
Factory Mutual (FM)	FM Intrinsically safe Approval*1	**FS17**
ATEX	ATEX Intrinsically safe Approval	**KS27**
Canadian Standards Association (CSA)	CSA Intrinsically safe Approval	**CS17**
IECEx	IECEx Intrinsically safe Approval	**SS27**

*1: Applicable for amplifier housing code 7.

■ OPTIONAL SPECIFICATIONS (Others)

Item			Description			Code
Painting	Color change		Amplifier cover only			P□
	Coating change		Anti-corrosion coating *1			X2
Oil-prohibited use			Degrease cleansing treatment			K1
Oil-prohibited use with dehydrating treatment			Degrease cleansing treatment and dehydrating treatment			K5
Calibration units *3			P calibration (psi unit)	(See table for Span and Range Limits.)		D1
			bar calibration (bar unit)			D3
			M calibration (kgf/cm^2 unit)			D4
Teflon film *2 *7			Diaphragm protection from sticky process fluid by FEP Teflon film attached with fluorinated oil. Operation range: 20 to 150°C, 0 to 2 MPa (Not applicable for vacuum service).			TF1
Operating temperature correction *4			Adjusting range : 80°C to Maximum temperature of specified fill fluid			R
Capillary without PVC sheaths			When ambient temperature exceeds 100°C, or use of PVC is prohibited			V
Gold-plated diaphragm *5			Inside of isolating diaphragms (fill fluid side) are gold plated, effective for hydrogen permeation.			A1
Material certificate			Process flange, Block	For Flush type		M2W
			Process flange, Block, Ring *6			M5W
			Process flange, Block, Pipe, Base	For Extended type		M2E
			High Pressure side: Process flange, Block, Pipe, Base *12 Low Pressure side: Process flange, Block	For Combination type		M2Y
Pressure test/ Leak test Certificate *11			(Flange rating)	(Test pressure)		
	EJX118B		JIS 10K	2 MPa (290 psi)	Nitrogen (N_2) Gas *10 Retention time: 10 minutes	T51
			JIS 20K	5 MPa (720 psi)		T54
			JIS 40K *8	10 MPa (1450 psi)		T57
			ANSI/JPI Class 150	3 MPa (430 psi)		T52
			ANSI/JPI Class 300 *8	8 MPa (1160 psi)		T56
			ANSI/JPI Class 300 *9	7 MPa (1000 psi)		T55
			ANSI/JPI Class 600 *8	16 MPa (2300 psi)		T58
	EJX438B	For A-Capsule	JIS 10K	2 MPa (290 psi)		T51
			JIS 20K, 40K, 63K	3.5 MPa (500 psi)		T53
			ANSI/JPI Class 150	3 MPa (430 psi)		T52
			ANSI/JPI Class 300, 600	3.5 MPa (500 psi)		T53
		For B-Capsule	JIS 10K	2 MPa (290 psi)		T51
			JIS 20K	5 MPa (720 psi)		T54
			JIS 40K *8	10 MPa (1450 psi)		T57
			JIS 40K *9	7 MPa (1000 psi)		T55
			JIS 63K *8	16 MPa (2300 psi)		T58
			ANSI/JPI Class 150	3 MPa (435 psi)		T52
			ANSI/JPI Class 300 *8	8 MPa (1160 psi)		T56
			ANSI/JPI Class 300 *9	7 MPa (1000 psi)		T55
			ANSI/JPI Class 600 *8	16 MPa (2300 psi)		T58

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*1: Not applicable with color change option.
*2: Applicable for flush type (process connection style code W.)
*3: The unit of MWP (Max. working pressure) on the name plate of a housing is the same unit as specified by option code D1, D3, and D4.
*4: Specify the process operating temperature for zero correction. Example: Zero correction by process temperature 90°C.
*5: Applicable for wetted parts material code SW, SE, SY, and HW.
*6: Applicable for flushing connection ring code 1, 2, 3, 4, A, B, C, and D.
*7: Applicable for flushing connection ring code 0.
*8: Applicable for flush type (process connection style code W.)
*9: Applicable for extended type and Combination type (process connection style code E and Y.)
*10: Pure nitrogen gas is used for oil-prohibited use (option code K1 and K5.)
*11: The unit on the certificate is always MPa regardless of selection of option code D1, D3, or D4. A flushing connection ring will not be applied when conducting the pressure test or leak test.
*12: Applicable for model EJX118B.

■ OPTIONAL ACCESSORIES

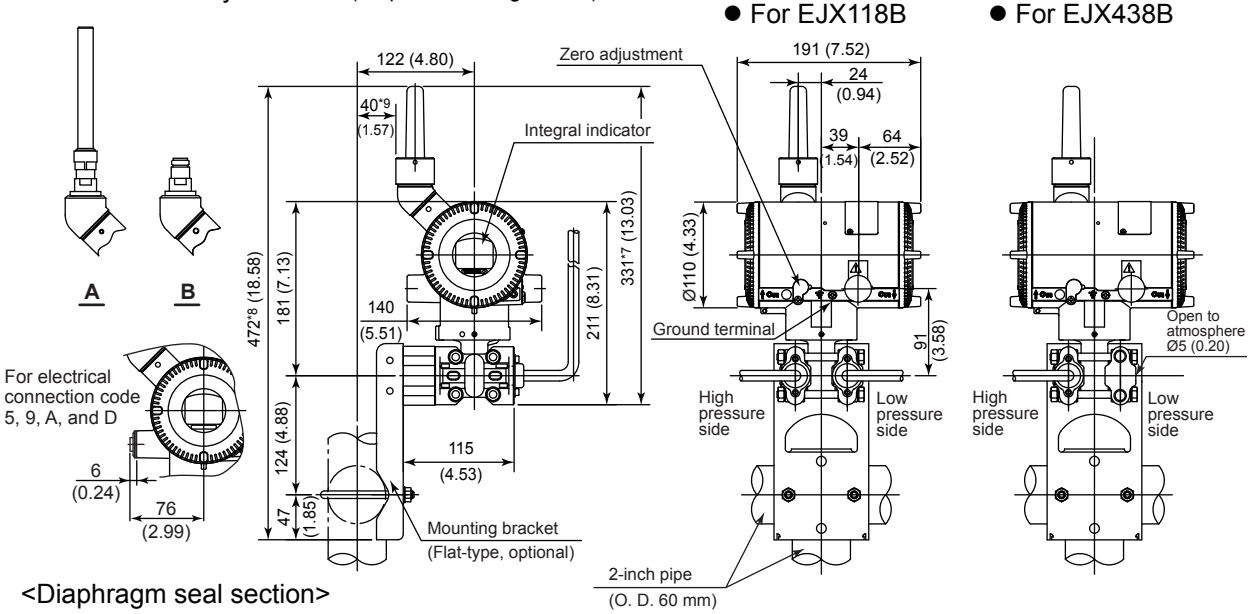
Product	Part number	Specification
Battery pack assembly	F9915NQ	Battery case, Lithium-thionyl chloride batteries 2 pieces
Batteries*1	F9915NR	Lithium-thionyl chloride batteries, 2 pieces
Battery case	F9915NK	Battery case only
Remote antenna cable	F9915KU	3 m with mounting bracket
	F9915KV	13 m (3 m+10 m), with arrester and mounting bracket
Antenna	F9915KW	2 dBi standard antenna
	F9915KX	0 dBi antenna
	F9915KY	6 dBi high gain antenna*2

*1: Alternatively, Tadiran SL-2780/S or TL-5930/S batteries can be purchased from your local distributer.
*2: Use of high gain antenna is limited by local regulation of radio and telecommunication law. Consult Yokogawa for details.

10.4 Dimensions

Unit: mm (approx. inch)

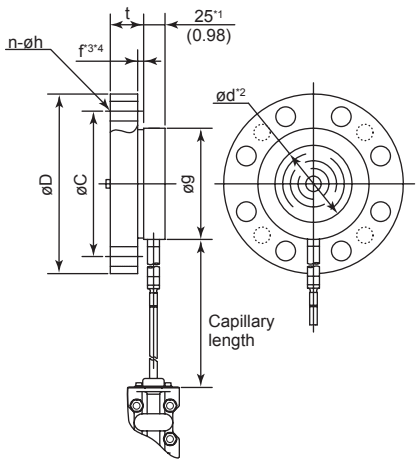
<Transmitter body section> (Amplifier housing code 7)



<Diaphragm seal section>

● Flush type

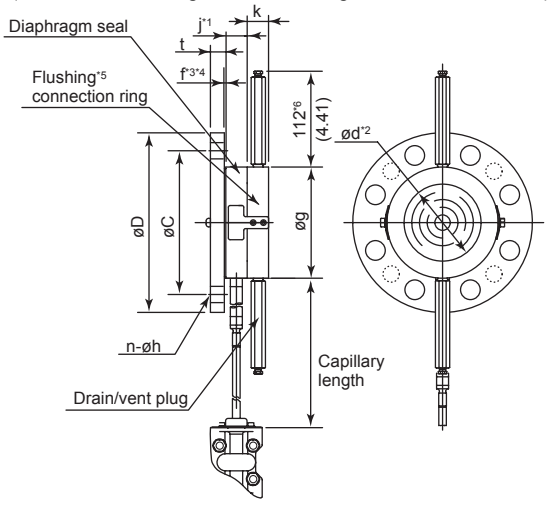
◆ No ring (Flushing connection ring code 0)



◆ With ring

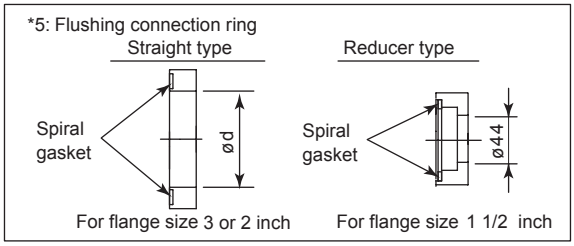
(EJX118B: Flushing connection ring code 1, 2, 3, and 4)

(EJX438B: Flushing connection ring code A, B, C, and D)



*1: When wetted parts material code **UW** (titanium), value is 34 (1.34).
*2: Indicates inside diameter of gasket contact surface
*3: In case where process flange material is JIS S25C, value of f is 0.
*4: In case where process flange material is JIS SUS304 in ANSI/JPI flange, value of f is included in t.

*5: Flushing connection ring



*6: When option code **K1** or **K5** is selected, add 11 mm (0.28 inch).
*7: When amplifier housing code 8 is selected, the value is 390 mm (15.35 inch). When amplifier housing code 9 is selected, the value is 270 mm (10.63 inch). In both cases, the figures are shown as A or B accordingly.
*8: When amplifier housing code 8 is selected, the value is 530 mm (20.87 inch). When amplifier housing code 9 is selected, the value is 410 mm (16.14 inch). In both cases, the figures are shown as A or B accordingly.
*9: When amplifier housing code 8 or 9 is selected, add 1 mm (0.04 inch) to the value.

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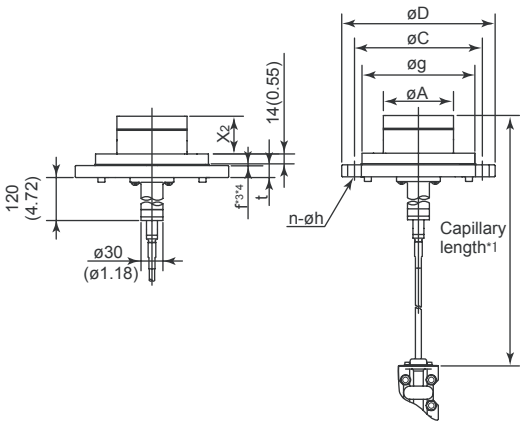
Unit: mm (approx. inch)

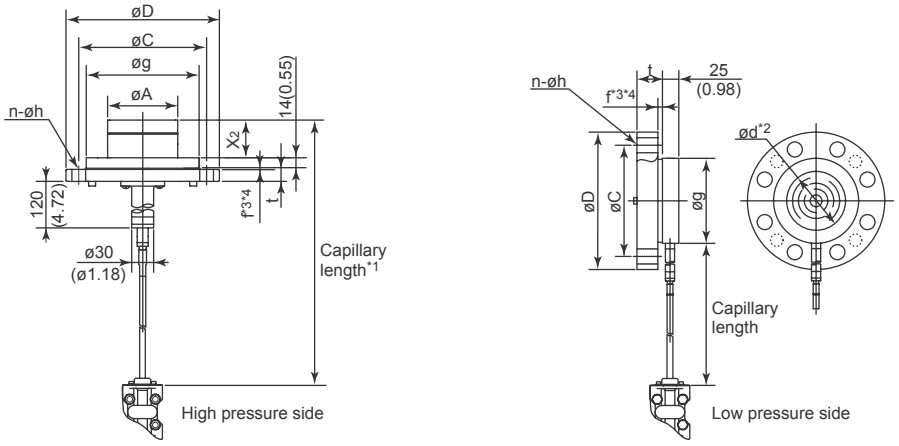
● Extended type



● Extension length (X_2)

Extension code	X_2
2	50(1.97)
4	100(3.94)
6	150(5.91)

● Combination type for EJX118B



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Unit: mm (Approx.: inch)

Process flange size: 4 inch (100 mm)

Code	Flange rating	øD	øC	øg	ød	t	f*3 *4	Bolt holes		j	k	øA
								No.(n)	Dia.(øh)			
J1	JIS 10K	210 (8.27)	175 (6.89)	155 (6.10)	—	18 (0.71)	0	8	19 (0.75)	—	—	96±0.5 (3.78±0.02)
J2	JIS 20K	225 (8.86)	185 (7.28)	155 (6.10)	—	24 (0.94)	0	8	23 (0.91)	—	—	96±0.5 (3.78±0.02)
A1	ANSI class 150	228.6 (9.00)	190.5 (7.50)	155 (6.10)	—	23.9 (0.94)	1.6 (0.06)	8	19.1 (0.75)	—	—	96±0.5 (3.78±0.02)
A2	ANSI class 300	254 (10.00)	200.2 (7.88)	155 (6.10)	—	31.8 (1.25)	1.6 (0.06)	8	22.4 (0.88)	—	—	96±0.5 (3.78±0.02)
P1	JPI class 150	229 (9.02)	190.5 (7.50)	155 (6.10)	—	24 (0.94)	1.6 (0.06)	8	19 (0.75)	—	—	96±0.5 (3.78±0.02)
P2	JPI class 300	254 (10.0)	200.2 (7.88)	155 (6.10)	—	32 (1.26)	1.6 (0.06)	8	22 (0.87)	—	—	96±0.5 (3.78±0.02)
D2	DIN PN10/16	220 (8.66)	180 (7.09)	155 (6.10)	—	20 (0.79)	0	8	18 (0.71)	—	—	96±0.5 (3.78±0.02)
D4	DIN PN25/40	235 (9.25)	190 (7.48)	155 (6.10)	—	24 (0.94)	0	8	22 (0.87)	—	—	96±0.5 (3.78±0.02)

Process flange size: 3 inch (80 mm)

Code	Flange rating	øD	øC	øg	ød*2	t	f*3 *4	Bolt holes		j*1	k	øA
								No.(n)	Dia.(øh)			
J1	JIS 10K	185 (7.28)	150 (5.91)	130 (5.12)	90 (3.54)	18 (0.71)	0	8	19 (0.75)	25 (0.98)	27 (1.06)	71±0.5 (2.8±0.02)
J2	JIS 20K	200 (7.87)	160 (6.30)	130 (5.12)	90 (3.54)	22 (0.87)	0	8	23 (0.91)	25 (0.98)	27 (1.06)	71±0.5 (2.8±0.02)
J4	JIS 40K	210 (8.27)	170 (6.69)	130 (5.12)	90 (3.54)	32 (1.26)	0	8	23 (0.91)	25 (0.98)	27 (1.06)	—
A1	ANSI class 150	190.5 (7.50)	152.4 (6.00)	130 (5.12)	90 (3.54)	23.9 (0.94)	1.6 (0.06)	4	19.1 (0.75)	25 (0.98)	27 (1.06)	71±0.5 (2.8±0.02)
A2	ANSI class 300	209.6 (8.25)	168.1 (6.62)	130 (5.12)	90 (3.54)	28.5 (1.12)	1.6 (0.06)	8	22.4 (0.88)	25 (0.98)	27 (1.06)	71±0.5 (2.8±0.02)
A4	ANSI class 600	209.6 (8.25)	168.1 (6.62)	130 (5.12)	90 (3.54)	38.2 (1.50)	6.4 (0.25)	8	22.4 (0.88)	25 (0.98)	27 (1.06)	—
P1	JPI class 150	190 (7.48)	152.4 (6.00)	130 (5.12)	90 (3.54)	24 (0.94)	1.6 (0.06)	4	19 (0.75)	25 (0.98)	27 (1.06)	71±0.5 (2.8±0.02)
P2	JPI class 300	210 (8.27)	168.1 (6.61)	130 (5.12)	90 (3.54)	28.5 (1.12)	1.6 (0.06)	8	22 (0.87)	25 (0.98)	27 (1.06)	71±0.5 (2.8±0.02)
P4	JPI class 600	210 (8.27)	168.1 (6.61)	130 (5.12)	90 (3.54)	38.4 (1.51)	6.4 (0.25)	8	22 (0.87)	25 (0.98)	27 (1.06)	—
D2	DIN PN10/16	200 (7.87)	160 (6.30)	130 (5.12)	90 (3.54)	20 (0.79)	0	8	18 (0.71)	25 (0.98)	27 (1.06)	71±0.5 (2.8±0.02)
D4	DIN PN25/40	200 (7.87)	160 (6.30)	130 (5.12)	90 (3.54)	24 (0.94)	0	8	18 (0.71)	25 (0.98)	27 (1.06)	71±0.5 (2.8±0.02)
D5	DIN PN64	215 (8.46)	170 (6.69)	130 (5.12)	90 (3.54)	28 (1.10)	0	8	22 (0.87)	25 (0.98)	27 (1.06)	—

Process flange size: 2 inch (50 mm)

Code	Flange rating	øD	øC	øg	ød*2	t	f*3 *4	Bolt holes		j	k
								No.(n)	Dia.(øh)		
J1	JIS 10K	155 (6.10)	120 (4.72)	100 (3.94)	61 (2.40)	16 (0.63)	0	4	19 (0.75)	25 (0.98)	27 (1.06)
J2	JIS 20K	155 (6.10)	120 (4.72)	100 (3.94)	61 (2.40)	18 (0.71)	0	8	19 (0.75)	25 (0.98)	27 (1.06)
J4	JIS 40K	165 (6.50)	130 (5.12)	100 (3.94)	61 (2.40)	26 (1.02)	0	8	19 (0.75)	25 (0.98)	27 (1.06)
A1	ANSI class 150	152.4 (6.00)	120.7 (4.75)	100 (3.94)	61 (2.40)	19.1 (0.75)	1.6 (0.06)	4	19.1 (0.75)	25 (0.98)	27 (1.06)
A2	ANSI class 300	165.1 (6.50)	127.0 (5.00)	100 (3.94)	61 (2.40)	22.4 (0.88)	1.6 (0.06)	8	19.1 (0.75)	25 (0.98)	27 (1.06)
A4	ANSI class 600	165.1 (6.50)	127.0 (5.00)	100 (3.94)	61 (2.40)	31.8 (1.25)	6.4 (0.25)	8	19.1 (0.75)	25 (0.98)	27 (1.06)
P1	JPI class 150	152 (5.98)	120.6 (4.75)	100 (3.94)	61 (2.40)	19.5 (0.77)	1.6 (0.06)	4	19 (0.75)	25 (0.98)	27 (1.06)
P2	JPI class 300	165 (6.50)	127.0 (5.00)	100 (3.94)	61 (2.40)	22.4 (0.88)	1.6 (0.06)	8	19 (0.75)	25 (0.98)	27 (1.06)
P4	JPI class 600	165 (6.50)	127.0 (5.00)	100 (3.94)	61 (2.40)	31.9 (1.26)	6.4 (0.25)	8	19 (0.75)	25 (0.98)	27 (1.06)
D2	DIN PN10/16	165 (6.50)	125 (4.92)	100 (3.94)	61 (2.40)	18 (0.71)	0	4	18 (0.71)	25 (0.98)	27 (1.06)
D4	DIN PN25/40	165 (6.50)	125 (4.92)	100 (3.94)	61 (2.40)	20 (0.79)	0	4	18 (0.71)	25 (0.98)	27 (1.06)
D5	DIN PN64	180 (7.09)	135 (5.31)	100 (3.94)	61 (2.40)	26 (1.02)	0	4	22 (0.87)	25 (0.98)	27 (1.06)

Process flange size: 1 1/2 inch (40 mm)

Code	Flange rating	øD	øC	øg	ød*2	t	f*3 *4	Bolt holes		j	k
								No.(n)	Dia.(øh)		
J1	JIS 10K	140 (5.51)	105 (4.13)	86 (3.39)	44 (1.73)	16 (0.63)	0	4	19 (0.75)	27 (1.06)	30 (1.18)
J2	JIS 20K	140 (5.51)	105 (4.13)	86 (3.39)	44 (1.73)	18 (0.71)	0	4	19 (0.75)	27 (1.06)	30 (1.18)
J4	JIS 40K	160 (6.30)	120 (4.72)	86 (3.39)	44 (1.73)	24 (0.94)	0	4	23 (0.91)	27 (1.06)	30 (1.18)
A1	ANSI class 150	127 (5.00)	98.6 (3.88)	86 (3.39)	44 (1.73)	17.5 (0.69)	1.6 (0.06)	4	15.9 (0.63)	27 (1.06)	30 (1.18)
A2	ANSI class 300	155.4 (6.12)	114.3 (4.50)	86 (3.39)	44 (1.73)	20.6 (0.81)	1.6 (0.06)	4	22.4 (0.88)	27 (1.06)	30 (1.18)
A4	ANSI class 600	155.4 (6.12)	114.3 (4.50)	86 (3.39)	44 (1.73)	28.8 (1.13)	6.4 (0.25)	4	22.4 (0.88)	27 (1.06)	30 (1.18)
P1	JPI class 150	127 (5.00)	98.6 (3.88)	86 (3.39)	44 (1.73)	17.6 (0.69)	1.6 (0.06)	4	16 (0.63)	27 (1.06)	30 (1.18)
P2	JPI class 300	155 (6.10)	114.3 (4.50)	86 (3.39)	44 (1.73)	20.6 (0.81)	1.6 (0.06)	4	22 (0.87)	27 (1.06)	30 (1.18)
P4	JPI class 600	155 (6.10)	114.3 (4.50)	86 (3.39)	44 (1.73)	28.9 (1.14)	6.4 (0.25)	4	22 (0.87)	27 (1.06)	30 (1.18)

*1: When wetted parts material code **UW** (titanium) is selected, value is 34 (1.34).
*2: Indicates inside diameter of gasket contact surface.
*3: In case where process flange material is JIS S25C, value of f is 0.
*4: In case where process flange material is JIS SUS304 in ANSI/JPI flange, value of f is included in t.

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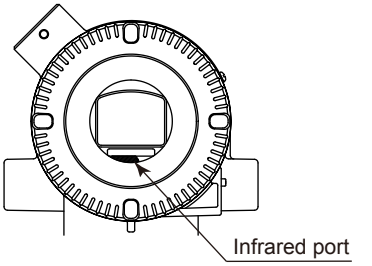
Infrared Configuration



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Revision Information

- Title : EJX118B and EJX438B
  Diaphragm Sealed Differential Pressure and Pressure Transmitters
- Manual No. : IM 01C27H01-01EN

Edition	Date	Page	Revised Item
2nd	Aug. 2010	—	Release of ISA100.11a protocol
3rd	Apr. 2011	—	• Adapted to device configuration tool with infrared communication function. • Part number change Battery pack: F9915MA → F9915NQ Delete F9915MX Battery: A1133EB → F9915NR Delete battery case part number
4th	Dec. 2011	8-6	8.4.6 Add battery case part number of F9915NK.
5th	Aug. 2012	—	Release of amplifier housing code 8 and 9.
6th	Oct. 2012	— 2-5, 2-6 10-3	Release of ATEX/IECEx intrinsic safe for amplifier housing code 8 and 9. 2.8.3, 2.8.4 Change the descriptions and the installation diagram. 10.1 Delete the limitation use for France.
7th	June 2013	—	Release of CSA intrinsic safe for amplifier housing code 8 and 9.